January 1989
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Publication

AMIGA WORLD

AMIGA STARTER KIT

What You Need For Your New System

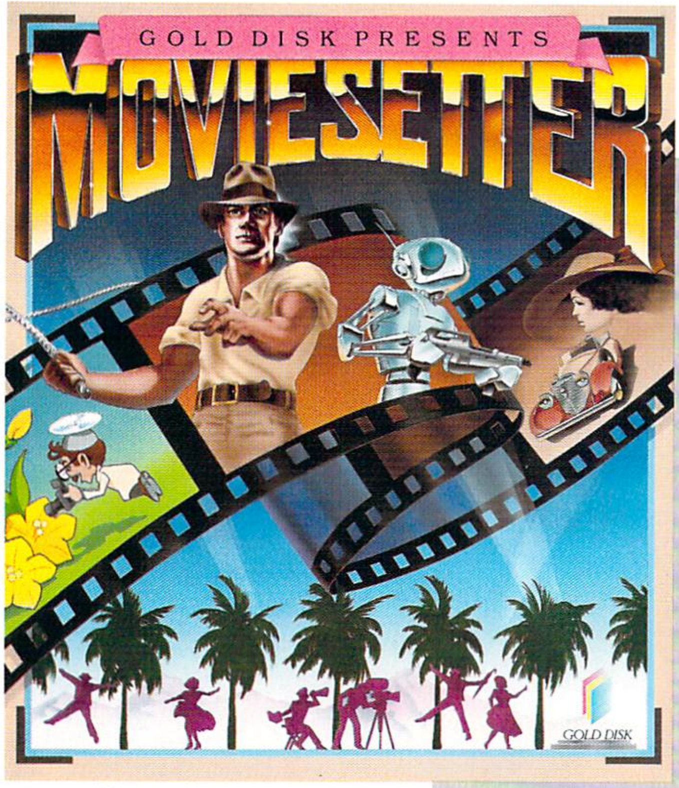
Plus!

Programming
- C Graphics
- BASIC



01
74470 65948 8

Saturday Matinee.



MovieSetter, the latest software blockbuster from Gold Disk, is the Amiga owner's ticket to pro-quality video animation and brilliant stereo soundtracks. And because of a software design breakthrough, it'll let you create dazzling overscan video movies that are minutes - not seconds - in length, without requiring truckloads of memory (512K minimum, 1MB recommended).

In spite of its power, MovieSetter is easy to use - even for the first-timer. Unlike other programs, it lets you see what you animate *as you animate it*. Using on-screen tools, it's easy to change speeds (up to 60 frames per second), colors (up to 32 on-screen at once), transition effects, and backgrounds. It's got handy built-in graphics and sound tools, and can import IFF graphic and sound files created by your favorite programs. Or you can take the shortcut and use the generous supply of "MovieClip" clip art and sound samples that are included with the MovieSetter program disk. Either way, "cutting together" your epic masterpiece will be a breeze with MovieSetter's full array of editing features - including the incomparable convenience of on-screen storyboards.

So bring a little tinseltown to your desktop. Call Gold Disk today at 1-800-387-8192 to order a copy of MovieSetter for only $99.95 (additional MovieClips sold for $34.95) or stop by your nearest Amiga software dealer.



Combine MovieClips, stereo sound, storyboards and...



history features to effortlessly create minutes of animation.

GOLD DISK
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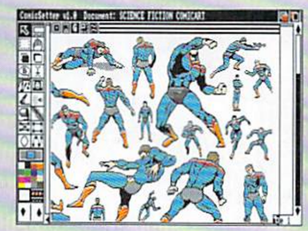
Sunday Funnies.



Think of Gold Disk's ComicSetter software as a sort of "desktop dream publisher". That's because it lets you translate your fantasies, visions, and personal outlooks on the world into sparkling, multipage color comics on the Amiga. It's a one of a kind program that's powerful enough for the serious comic artist, yet simple enough for the casual doodler.

Blammo! Start with a versatile cast of ComicArt characters, props and backgrounds that you can customize to create endless original scenes and situations. **Zabloowie!** Add your own characters with the built-in bitmapped and structured graphic tools, or import graphics from your IFF paint program of choice. **Klongg!** Pop on speech and thought balloons and fill them with words written in special comic fonts that simulate that painstaking, "hand-lettered" look. **Cha-boing!** Organize your panels into a short and pithy "one-pager", or create a full length comic book that's as many pages as your disk can store. **Whirrr!** Print your comic classics out on a wide range of thermal and inkjet printers, or any of a number of black and white dot-matrix models.

So explore the world of "desktop dream publishing". Call Gold Disk today at 1-800-387-8192 to order your copy of ComicSetter for only $99.95 (additional ComicArt sold for $34.95) or stop by your nearest Amiga software dealer.



Combine ComicArt characters and backgrounds...



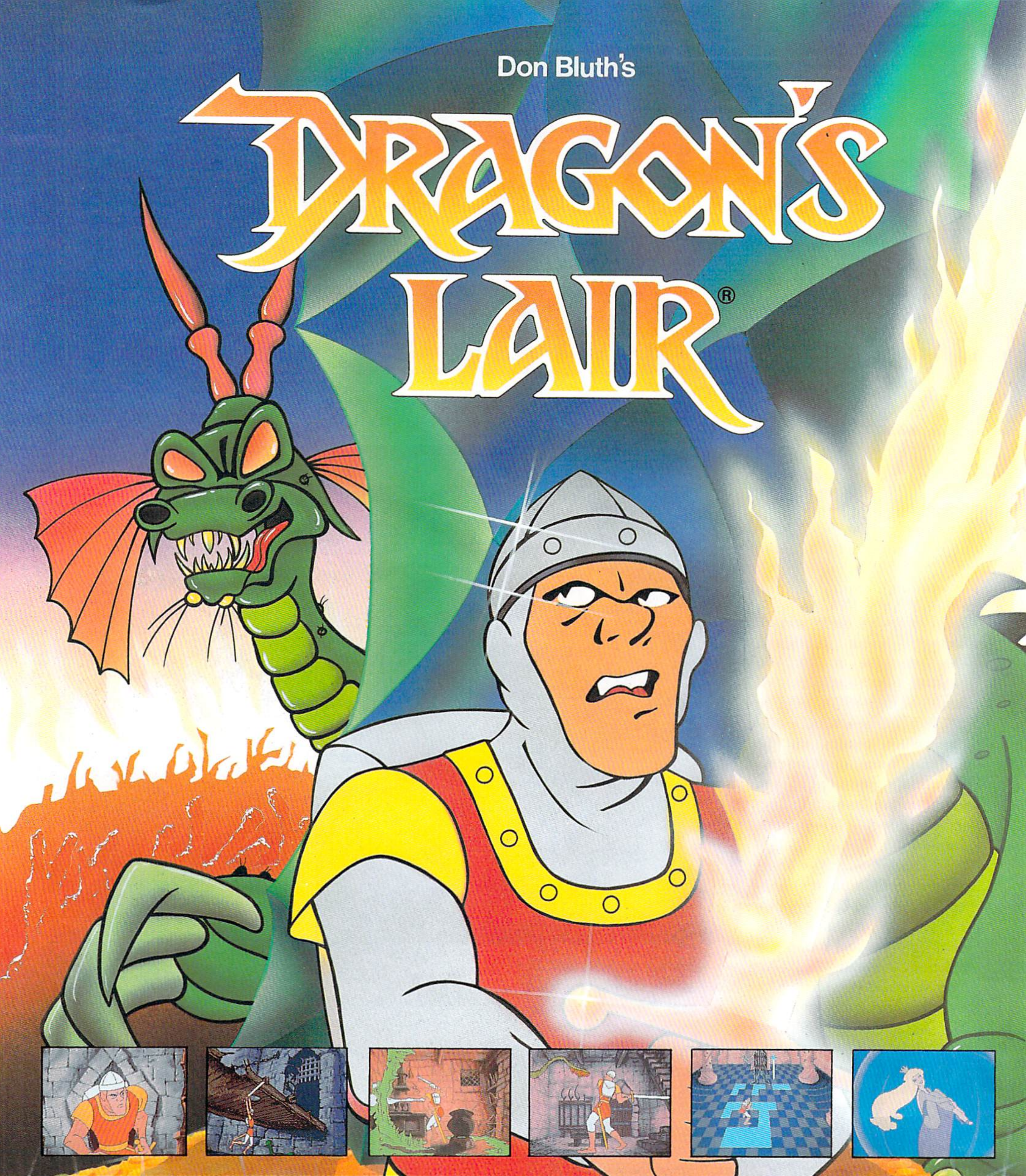
with speech balloons and Comicbook typefaces.

GOLD DISK

P.O. Box 789, Streetsville
Mississauga, Ontario, Canada, L5M 2C2
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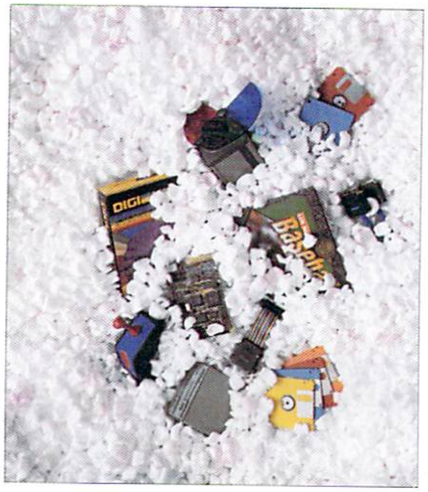
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Don Bluth's
DRAGON'S LAIR®

VOLUME 5, NUMBER 1 JANUARY 1989

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When you opened the box to your new Amiga computer system, you probably didn't find the kind of items in our Amiga Starter Kit (above). The unfortunate fact is that once you get your system hooked up and running, you're going to start asking questions, like: "What programs should I get and what peripherals do I need to do the things I want to accomplish with my computer?" or, if you get by that hurdle, "How can I expand my system's memory and disk-storage capacity to use the programs and do the applications I really *want to do?" That's why we're presenting our special Amiga Starter Kit of essential software and hardware. So delve right in and learn what you need to make Amiga computing exciting, productive, and just plain fun!*

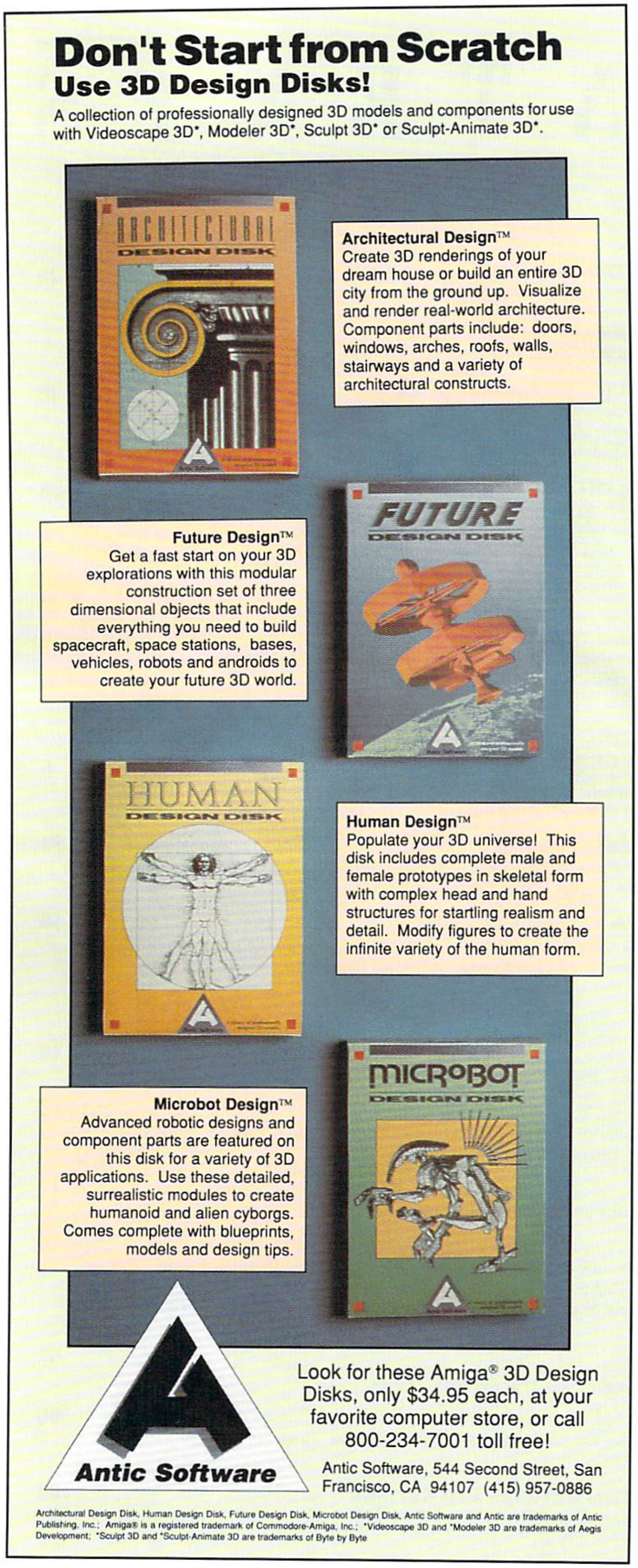
FEATURES

ARTICLES

COLUMNS

DEPARTMENTS

COVER PHOTOGRAPH BY ED JUDICE



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ZEITGEIST

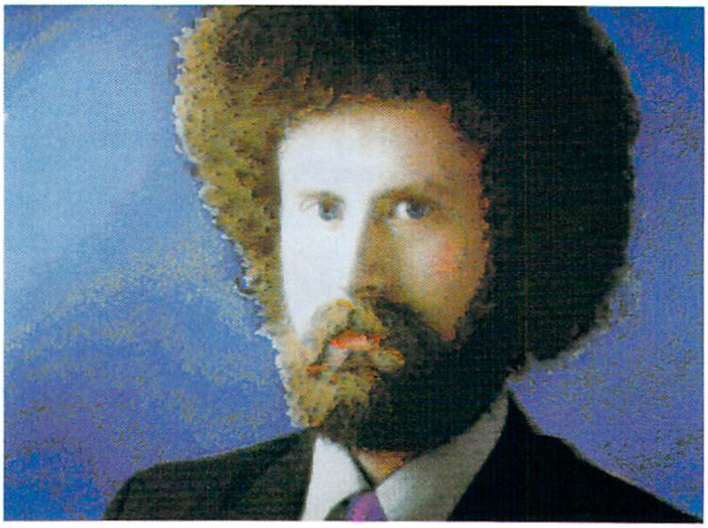
Fear and Loathing at AmiExpo.

"Normally I don't go out much. . . honest."

BIG AMIGA EVENT of the year in LA. Thousands of people from all over the world descending on the Westin Bonaventure hotel. Dealers, developers, users, abusers, and the press from a dozen magazines all trying to get their Amiga thrills in a concentrated three-day dose.

So maybe you didn't get to last October's AmiExpo in LA. The magazines usually give you a blow-by-blow a few months later. What the new products on the show floor were like and hints about the seminars and talks. What the magazines don't tell you about is the part of an Amiga show the general public doesn't usually get to see. The part that requires a ribbon on your badge that says "Exhibitor," "VIP," "Speaker," or "Press."

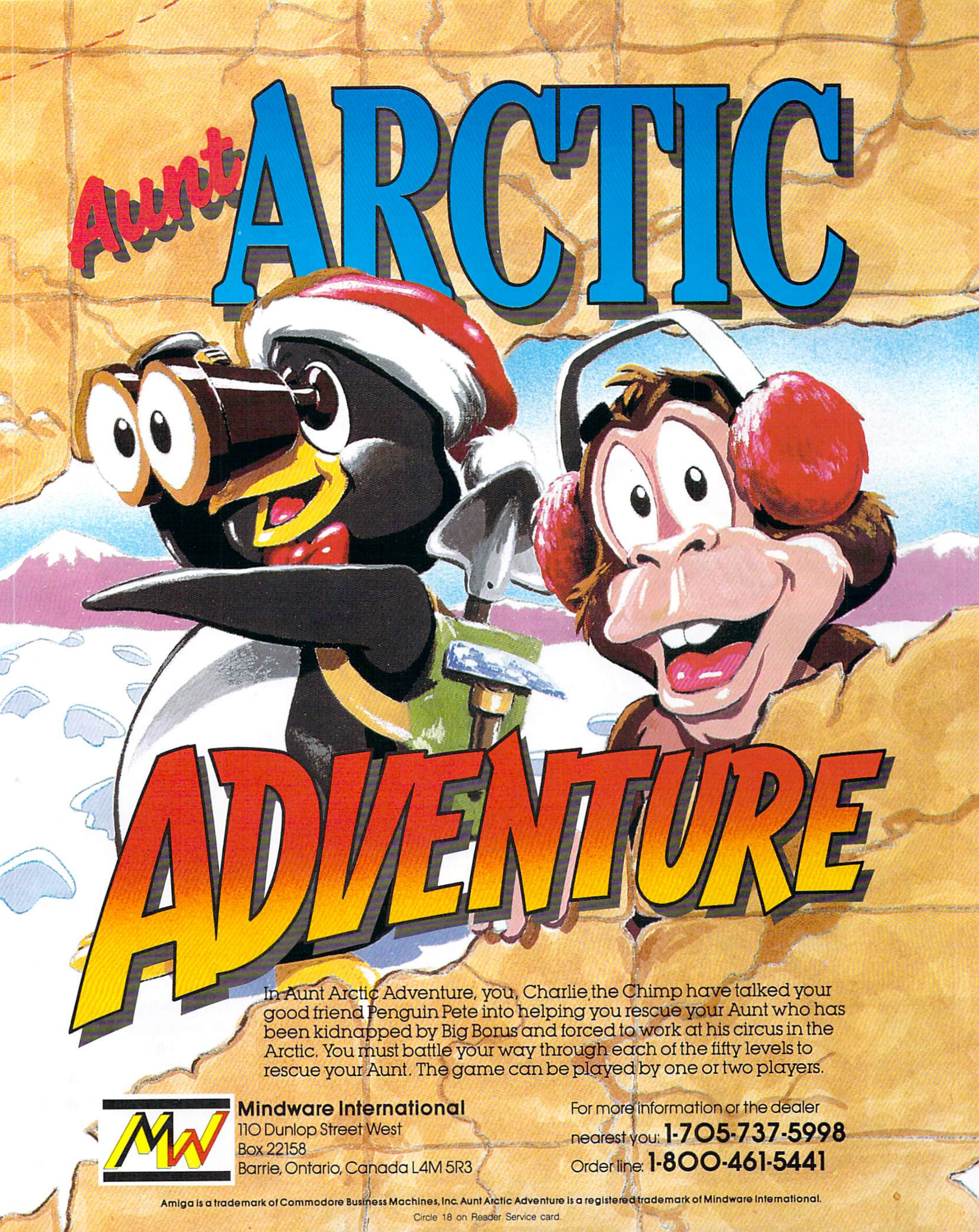
Different ribbons get you different things. A Speaker ribbon gets you into the speakers' lounge, gets you noticed on the show floor, gets people staring at your chest trying to read your name, and it gets you into all the special show receptions and parties. In a strange way a Speaker ribbon makes you invisible. You can come and go on the show floor or the seminars and talks and people look at you but don't stop you. Another advantage of a Speaker ribbon is that the coffee is usually better in the speaker's lounge than in the press room.



A VIP ribbon gets you into all of the places that the Speaker ribbon will, with a few extras thrown in. Depending on the type of VIP ribbon you have, you can go anywhere at any time. People aren't sure how to deal with a VIP because there are only a handful of them around; some are keynote speakers while others are on the Expo staff.

An Exhibitor ribbon gets you onto the show floor at any time. You can carry things in and out and the guards at the doors just smile. If you want to pull a major heist, get an Exhibitor ribbon and a truck. Exhibitors get invited to lots of receptions, parties, and meals. They also have to man the booths. These are mutually exclusive activities and require careful balancing to do both. Exhibitors want to get a look at what everyone else is doing as much as you do, but they are there primarily to be seen—by the public, by distributors, by the press.

A Press badge is almost magic. It gets you into the show and seminars (but not after hours). It gets you invitations to just about every event, reception, and party. You get invited to breakfasts, lunches, dinners, and drinks (lots of drinks). You get special invitations to private suites where the latest and greatest (not ready to be shown on the floor) can be demo'd one-on-one. You get invitations to press conferences, which are usually pretty dry affairs held at absurd hours of the morning to punish reporters who have a tendency to stay out drinking until 3 or 4 AM. ►


Aunt ARCTIC
ADVENTURE
In Aunt Arctic Adventure, you, Charlie the Chimp have talked your good friend Penguin Pete into helping you rescue your Aunt who has been kidnapped by Big Borus and forced to work at his circus in the Arctic. You must battle your way through each of the fifty levels to rescue your Aunt. The game can be played by one or two players.
MW
Mindware International
110 Dunlop Street West
Box 22158
Barrie, Ontario, Canada L4M 5R3
For more information or the dealer nearest you: 1-705-737-5998
Order line: 1-800-461-5441
Amiga is a trademark of Commodore Business Machines, Inc. Aunt Arctic Adventure is a registered trademark of Mindware International.
Circle 18 on Reader Service card.

A Press ribbon will also get you into the press room, if there is one. Press rooms are pretty much what you might imagine them to be. Tables littered with empty Styrofoam cups and overflowing ashtrays, and stacks of media kits for those reporters who can't get it together to actually visit the booths. Another table with a stainless steel urn one-quarter filled with burned coffee and trays of danish crumbs.

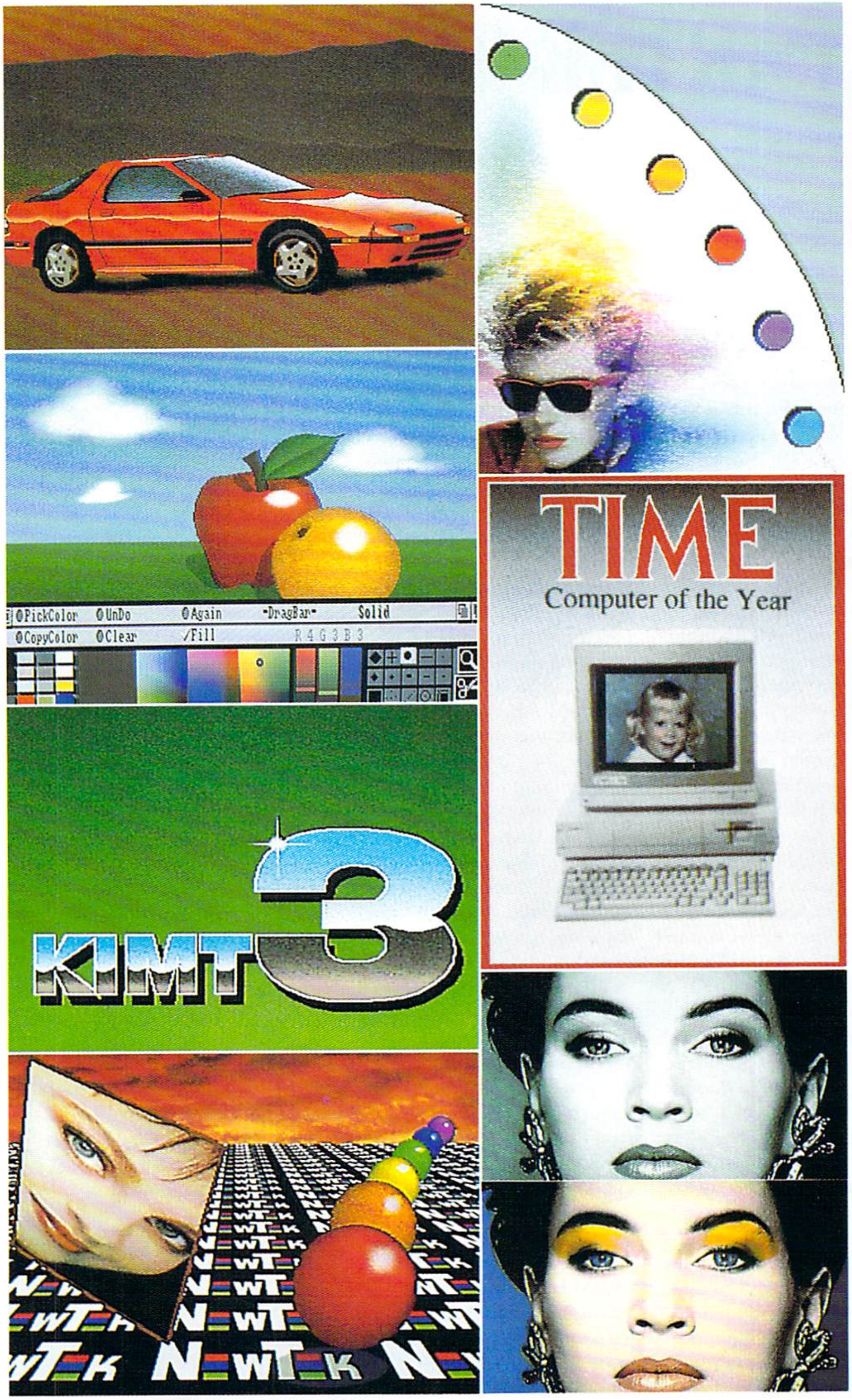
Going to so many shows for so long, I have made many, many friends (at least they seem like friends) who I only meet at shows. There are people who have changed companies every time I see them. People who don't go to many receptions, and people who go to everything. People who just talk about business, and people who like to debate the philosophical implications of alien contact over beer at 2:30 AM. People who drag me out to fine restaurants, sushi bars, delis, discos, nightclubs, parties, bars (both high and low) and other, less than seemly establishments. Normally I don't go out much . . . honest. Well, once in a while. OK, I don't protest much. But these are the people we write about and only a part of the story is on the show floor.

So, up at 7 AM for a press conference at 8:00 (please let there be coffee). Down to the show to meet four people at our booth for a breakfast meeting at 9:15. Back to the show to get a special demo at 11:00, then meet another group for lunch. After lunch it's back to the show, see a few of the booths, then up to my room before heading to a private suite at 3:00 for another private demo. Back to the show to hang around the booth for a while until the show closes. Meet someone else for drinks before the first of two receptions (each with hors d'oeuvres, drinks, live music and dancing). At 8 PM I'm supposed to meet six more people at the hotel bar before going out for a late dinner to talk about their new software plans. After dinner, we catch a cab and go to a nightclub before heading back to the hotel.

Walking through the hotel lobby, I'm cornered by another group of developers who are winding down the evening. "Have a nightcap with us," they say, and while sitting with them, two people leave but five more join us. By this time I have been going for about 18 straight hours—talking, eating, drinking, listening, and running around. Even though it is about 1:30 AM, someone stops by and mentions that his company is having a late, late party up in their suite and "you mean you haven't seen my latest and greatest demo? Come on up to the room right now and I'll show it to you. My partners are up there drinking at this very moment." Knowing that I have the next day booked solid, I somehow manage to get upstairs for the party and the demo (this is where the conversation gets around to aliens), and an hour or two later I look at my watch and realize that in four hours I'm supposed to have an early breakfast meeting, then my keynote speech, then a press conference, etc. . . .

That is why we send two or three people to AmiExpos. One for the show floor, one for the seminars, and I go to meals, bars, demos, receptions, and nightclubs. And they pay me, too. If you can think of a better job, I'd like to hear about it.





ONLY DIGI PAINT CAN DO ALL THIS

Digi-Paint gives you the best Amiga graphics possible — using all 4,096 colors at once! Unleash your creativity with powerful tools and dozens of special effects, including blend, shade, tint and mirror. Digi-Paint is the perfect way to manipulate pictures digitized with NewTek's Digi-View Gold. Create images for printouts, presentation or desktop publishing with the award winning Digi-Paint.

Here's what people are saying about Digi-Paint . . .

"We were very impressed with the power of Digi-Paint. We found lots of potential for creativity and enjoyment."
AMIGA WORLD

"We've been blown away by the effects and the tools that Digi-Paint supplies. The results can be spectacular."
INFO

"Digi-Paint is the first paint program that makes it feel as if you're actually painting. Digi-Paint gives you unlimited freedom."
COMPUTE!

"We have personally seen $40,000 computer graphic terminals that couldn't come close to Digi-Paint's power."
COMPUTER SHOPPER

"Digi-Paint is remarkable."
BYTE

"Digi-Paint is a $60 wonder. Using the dizzying menu of features, the results can be startlingly realistic."
VIDEO MAGAZINE

"Digi-Paint is a new generation paint program with exciting and unique features you will simply not find anywhere else. It is extremely powerful, and at its price, it's a steal."
AMAZING COMPUTING

Digi-Paint is available now at your local Amiga dealer or call 1-800-843-8934.

ONLY $59.95

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NEWTEK
INCORPORATED

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REPARTEE

Comments, complaints, and concerns

from AmigaWorld *readers.*

Emission Control

IN RESPONSE TO Mr. Richard Davis' letter in your November '88 issue ["Cut and Splice," Repartee, p. 8], Commodore has spliced *nothing* on either the mouse or keyboard of the A2000. Those nice little heat-shrink jobs rigidly secure the RF (radio frequency) cores that are often used on frequency generating (oscillating) equipment (such as an Amiga 2000). Remember, it's the F.C.C. that requires spurious RF emission controls.

There are many ways to suppress RF; Commodore chose ferrite cores, as have many others. Commodore went one step further and secured them with heat shrink to guarantee that the cores would remain at an exact distance from the cables' exit of the computer where RF emissions would be most likely to occur.

Gary R. Knight
Day and Knight
Electric-Security
Tampa, FL

AmigaTeX Addendum

IN JEFFREY BLUME'S article on ARexx ["ARexx: New Kingpin of Multitasking?" *AmigaWorld*, Nov. '88, p. 55], Mr. Blume lists several programs that currently support ARexx. I noticed that AmigaTeX is listed as a public-domain program. I have a copy of AmigaTeX that I have been overjoyed with since I *purchased* it from Radical Eye Software a few months ago. I think you should tell Mr. Blume that he has made a grave error in stating that AmigaTeX is public domain. It is a piece of commercial software that was ported over to the Amiga by Tomas Rokicki and is being sold by his company, Radical Eye Software. It is true that TeX for mainframe systems is a public-domain program, but many implementations of TeX have been written for almost every micro and mini, and these are *not* public domain.

TeX for the Amiga had to be rewritten totally in C and assembly. It comes with the best Previewer for any microcomputer, which allows you to see your document in all of its glory and font sizes before it is printed. AmigaTeX with a printer driver for your particular printer will cost $300.

Kevin E. Gardner
Physics Lab Director
Hope College
Holland, MI

Top 40 Fallout

I KNOW YOU'RE going to get a rash of letters telling you about the mistakes you made on your selection of the top 40 Amiga games ["*AmigaWorld* Top 40 Games," Nov. '88, p. 29], so you can toss this one on that pile.

Generally, I thought your list was pretty good, but with three exceptions:

1. There were no Psygnosis games in the list, and I believe they make some of the best! Graphics and playwise, Terrorpods is a sure top 10, at least. Although Barbarian and Obliterator might not be the most mind-boggling, they kept me coming back for more.
2. One good thing that Commodore has come out with is Mindwalker. Frankly, I consider this the most underrated game for the Amiga.
3. Emerald Mine as best game?! You're just trying to make me laugh, right? Come on, guys! Give me a break! I would call Emerald Mine an average game at best. It's fairly amusing, has limited staying power (how long can you get excited about dodging rocks?), has zero originality (this game concept has been around for years), and the graphics are adequate but not great. I've seen public-domain games that rival Emerald Mine.

Tomm Munro
Federal Way, WA

Hard-core Miner

I REALLY ENJOYED the top 40 Amiga games article. As a hardened, late-night, "just once more before I call it a night" addict of Emerald Mine (Constellation Software), I wholeheartedly agree with the choice of this game as Number One. I was surprised, however, that Ferrari Formula One (Electronic Arts) did not make the top 40 list.

Ken L. Boi
Glendale Heights, IL

The Quest for Software

IT SEEMS AS though all we Amiga owners demand these days are new and fantastic hardware developments. I think that this attitude is healthy, but only to a certain extent. What is sorely lacking in our sphere of computing is not capable hardware, but *software*.

My Amiga 1000 is as advanced, technologically speaking, as any microcomputer sold. But my IBM PC is more useful, simply because it has the programs that most people need readily available.

Let's address the real problem we Amiga users face. If you need a piece of software that is only available for some other machine, write the publisher! That type of positive action is what will move our computing community forward.

John Byrne
Miami, FL

Send your letters to: Repartee, *AmigaWorld* Editorial, 80 Elm St., Peterborough, NH 03458. Letters may be edited for space and clarity. ■

NOTEPAD

Compiled by Linda Barrett

The End At Last

FOR MONTHS, DICK Newell of Billings, MT wanted to upgrade from his Commodore 64 to an Amiga, but could not stretch his teacher's salary to cover the large bill. He had two upgrade paths: The most reliable was setting up a special Amiga bank account. The more circuitous was to follow the twisted logic of *AmigaWorld*'s Summer '88 Treasure Hunt across the country to San Francisco.

Eager for the challenge, Dick and his wife Carolyn lived and breathed the Treasure Hunt for three months, even taking the issues with them when they went on vacation to visit the rest of the family—a clever strategy as Dick's brother helped them out with a few troublesome clues. Outside of his family, Dick's biggest backer was the local research librarian. "After a while, I couldn't surprise her anymore, no matter how bizarre my requests sounded," Dick laughed.

Keeping his mind on work the day of the drawing was difficult. "I tried to think positively," he told us. "It sounds silly, but I tried to stay in a winning frame of mind in case it helped. I was willing to try anything at that point." Dick was at the high school teaching his woodworking class for special-ed students, which also helps them find community jobs to gain practical experience, when we called his house with the good news. Carolyn immediately called Dick, who quickly called his research librarian. "She was almost as excited as I was!"

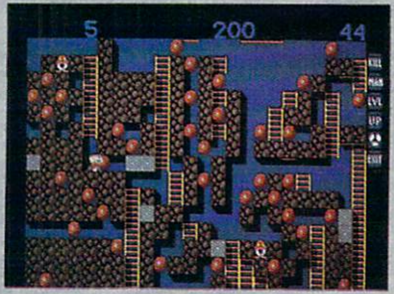
The A2000 was the real treasure, but the trip gave their hunt an especially happy ending. For Dick and Carolyn, the luxury weekend at the Mark Hopkins Hotel was their second getaway to San Francisco. The first was 14 years ago on their honeymoon. "This is so romantic for us. We haven't been this far from home since our two girls (ages nine and five) were born," Carolyn confided.

When we met the Newells for the prize presentation ceremony, they headed straight for the computer table, to make sure they hadn't imagined the whole thing. "I had saved enough to buy an A500, then you called and said I'd won. This is what I really wanted," he added. Much of his thanks went to Andy Drexler, the owner of Go Amigo of Palo Alto, CA, the world's largest distributor of Amiga products. Andy generously donated the A2000 and monitor and was the life of the presentation party. Always with an eye out for an angle, Andy invited Dick to join him at his weekly poker game that evening, adding he would happily accept the computer as collateral. Carolyn wisely declined the invitation for him.



The culprits and victors of *AmigaWorld*'s Summer '88 Treasure Hunt gather around the spoils. From left: Andy Drexler, owner of Go Amigo, donated the computer system and offered to sign everyone up for the "software of the month" club; Linda Barrett, Contest Chairman, is still struggling to stop phrasing every sentence as a riddle; Carolyn Newell, a primary grades teacher, took time off to earn her Master's degree and help her husband solve the clues; Dick Newell, That Lucky Winner from Billings, MT, hopes his treasure hunt success is the start of a winning streak (in the contest to write Montana's new state slogan he entered "Montana—Third from the left"). Dan Sullivan, Head Clue Writer, hid behind the camera hoping to retain his anonymity and keep frustrated treasure hunters from becoming head hunters. (Send threats and compliments to him care of *AmigaWorld* editorial.)

Over much celebratory champagne, we discussed Dick's plans for his new toy. His interests range from 3-D graphics and animation to fine printing to music to architecture. For some time he has contemplated learning the principles of electrical concepts by experimentation. "I'm sure Carolyn would rather I practiced on a circuit simulation program than on the house wiring," he said, "although that would be more dramatic." An avid reader, Dick says one of his first purchases will be a database. "I have stacks and stacks of index cards with titles of books I want to read or investigate. Taking a database report to the library would be a lot more convenient than a file box." When he's not reading or skulking through the stacks, Dick is an avid fan of handmade jigsaw puzzles, hard ones. For his own deviously difficult puzzles, he plans on using Digi-View to create 3-D images that he will cut into intricate patterns. Perhaps Dick should help write next year's clues rather than try to solve them. —*LJB*

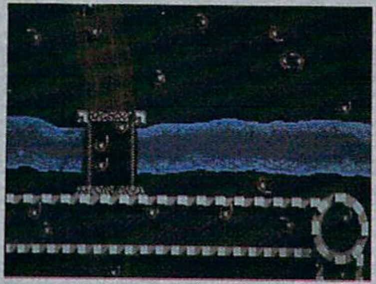


Targis
Amiga Version

Targis

Spies have stolen valuable parts from a secret laboratory and have hidden them in their cavernous hideout. Targis, our best agent, has followed the spies into their lair and must retrieve the parts. Equipped only with a "safe" blaster, he must journey through the many levels of the cave hideout and GET THOSE PARTS!

Over one hundred randomly selectable levels. A screen editor allows you to create new mazes to explore and share with your friends. An infinite number of levels are possible and allow unlimited hours of playtime. Share the danger and the honor of helping Targis save the free world.



Kingdoms of England
Amiga Version

Kingdoms of England

Enter into a land of long ago, where Kings and Knights kept the peace and honor of England. Reunite the lands of England and bring happiness to your subjects.

Kingdoms of England features a full size map of England. Battles and special occurrences have full size representations of the area and allow full control over hand to hand combat between the opposing armies.

A huge playing map, takes you through thousands of possible scenarios and screens on your quest for the Crown of England. One or Two player support!



Snake Pit
Amiga Version

Snake Pit

The evil Melator does not like snakes. In fact he thinks that snakes have no right to live. But, he is a fair man and so he has put forth a challenge to your kind; survive his dungeon and he will allow your race to survive.

But be careful, the levels are full of tricks, along the levels of his dungeon the evil Melator has placed food. Some food helps you to grow, some makes you smaller. Finding secret walls and passages may help you on your quest to rid your race of the doom looming over it.

Snake Pit features over 100 levels of play. Levels too difficult for you?? Well, make some easier ones using Snake Pit's level editor. Or if you think you're so good and this quest is too easy for you, design your own deviously complicated levels and share them with your friends. Unlimited number of levels makes for endless hours of enjoyment.

INCOGNITO
S o f t w a r e

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Incognito Software
(313) 462-2148 Voice Line
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Programmers and Artists Wanted, Call Us.

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LA Gear

MOST OF THE action in Los Angeles last fall was at Dodger Stadium, but AmiEXPO-California still managed to attract over 6,700 Amiga fans to the Westin Bonaventure during the weekend of October 7–9.

Joel Shusterman, Commodore's Vice President of Marketing, led off the series of three keynote addresses by focusing on the outlook for the Amiga in '89. Shusterman admitted that in the past the company has failed in the realm of Amiga marketing and advertising. The Amiga is a "marketing man's dream" according to Shusterman, who perceives that his role is to spread the word about the machine.

As for marketing strategy, Commodore must "pick its own battlefields," says Shusterman. Plans call for moving into fields where the Amiga has an edge, such as the graphics and design market, with Amiga advertising in appropriate trade journals.

Shusterman also detailed a new policy, whereby Commodore will announce only new products that will be available within 90 days. Products currently in that elite group include the *2286 Bridgeboard*, an IBM PC/AT on a card, and the *2620 Card*, an accelerator for the Amiga 2000. For the growing number of disgruntled users who have had technical problems with their Amigas, Shusterman offered a ray of hope, stating that customer service and support at Commodore is improving and will become a number one priority. It was nice to hear someone from CBM acknowledge the problem.

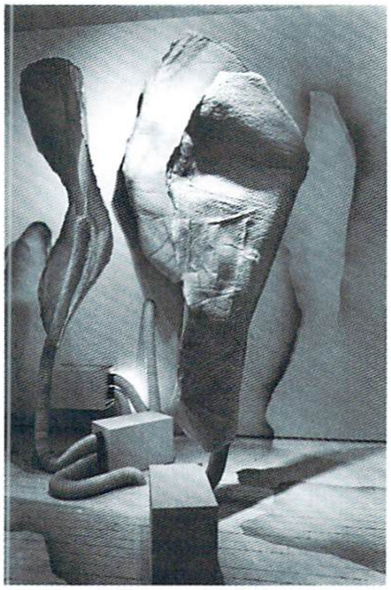
New products introduced at the show included Byte by Byte's *Sculpt-Animate 4D*, an upgrade to Sculpt-Animate 3D designed for professional applications. NewTek announced the *3.0 upgrade to Digi-View*, which includes overscan capability. Antic Software unveiled *Zoetrope*, a low-cost animation system developed by Jim Kent, author of Aegis Animator. Speaking of Aegis, they have a new entry in the CAD arena—*Aegis Draw 2000*, which promises to combine state-of-the-art CAD performance with the ease of use of a paint program.

Oxxi announced *A-Talk III*, a communications and terminal emulation program with an expanded Script language. Brown-Wagh got a lot of attention with demonstrations of *MIDI Magic*, their new MIDI sequencer. Gold Disk has been busy developing a *hardware/software interface* for the Canon IX12 black-and-white, 300-dot-per-inch scanner, which will allow you to save images as black-and-white IFF files at 300 dots per inch. Mindware introduced *PAGErender3D*, a 3D tool for artists that generates 3D in any number of bit planes, and *Charon 5*, a new game combining strategy and arcade elements.

About 500 Amiga fans made their way to the Los Angeles "Stock Exchange" building for an unusual presentation. "Amiga Visions" featuring the music of Silent Warhol combined live performance with videos and music. Effects were produced with the Amiga equipped with A-Squared's Live! video digitizer, Digital Creations' SuperGen genlock, and Elan Design's Invision software. While the audience appreciated the video effects, many seemed bewildered by the overall performance.

As in previous AmiEXPOs, the Amiga Video and Graphics Theater, co-sponsored by Sony Corp., spotlighted presentations from Amiga video artists. As an extension, the show committee announced the first annual *AmiEXPO Art and Video Contest*. Judging is scheduled to take place at AmiEXPO New York, March 3–5. (See next month's Notepad column for more details on the contest.)

—SL



A section of Air Player X sways in the Amiga-controlled breeze.

Blowin' in the Wind

PICTURE YOURSELF FLOATING deep undersea, watching kelp fronds oscillate in the current and listening to the muted calls of distant whales. Now you're in the right frame of mind to experience Air Player X, an Amiga-driven kinetic sculpture by New York artist Sara Garden Armstrong. The work combines movement with real and digitized sound, painting, sculpture, and lighting. The chain of command begins with an Amiga 500—it activates blowers, which in turn set seven monumental (five- to ten-foot) hand-cast paper forms swaying. The modulated breath-like sonance that emanates from the ensemble harmonizes with transformed-digitized blower sounds playing through the Amiga.

One performance, including distinct patterns and random elements, cycles in 20 to 30 minutes. Composer/programmer Nick Didkovsky, also of New York, used Perfect Sound (SunRize Industries) to digitize the background track. He worked with Sara on the sound and movement composition, and wrote the orchestration program using HMSL (Hierarchical Music Specification Language) from Frog Peak Music. While HMSL works on the Macintosh as well as the Amiga, Nick says there is no comparison. "The Mac doesn't afford you nearly as much control over sound as does the Amiga."

Air Player X is on exhibit at New York City's Souyun Yi Gallery (249 Centre St., 212/334-5189) from December 3 through 24, 1988.

—BG ■

HORS D'OEUVRES

Hints, tips, and techniques

from your fellow Amiga users.

STICKY DISK LABELS

REGARDING MR. NINER'S suggestion to use toupee tape for sticking customized labels on 3.5" disks ["Disk Label Tape," Hors d'oeuvres, Nov. '88, p. 12], I find that using 3M spray mount artist's adhesive, which you can buy at any arts and crafts supply store, may be a better method. Just spray on the back of the customized labels sheet, and with scissors or an exacto-knife, cut to the size you like.

R. Hernandez
Alhambra, CA

PATH NAME SPEEDUP REVISITED

THE FEBRUARY 1988 Hors d'oeuvres column contained a suggestion from Mr. Cletus Baker regarding speedup of the startup-sequence by using the complete path name in front of each command ["More and More Startup Speedups," p. 14]. This is a good idea and does indeed provide faster startup, but there are two things you have to be careful of.

The first is that not all commands are in the C directory. For example, suppose you want to start up with a different keymap. You should use

sys:System/SetMap (whatever)

not

C:SetMap (whatever)

in the startup-sequence because SetMap is in the System directory (on the Workbench disk, at least), not the C directory. Notice the difference in syntax, also. C: is a logical device that is assigned to the boot disk's C directory by AmigaDOS when you boot up. No logical device is assigned to the System directory (sys: is the logical device assigned to the boot-up volume itself), so you have to provide the full path name.

The second is that there are some commands in the C directory that cannot have C: before them. These are: ELSE, ENDIF, LAB, and nested IF. The reason for this is that the CLI is looking, for example, for ENDIF. It will not recognize C:endif as what it needs.

Peter Orvis
Arlington, VA

FOUR TIDBITS

1. THERE ARE PADS designed to hold a typewriter in place on your desktop. If you put one of these under your printer, it will reduce printing noise by more than you might think, and because it reduces vibration, it could extend the life of your printer. They are also made out of the exact same material as those expensive little mouse pads, at about a quarter of the price per square foot. I managed to find one big enough so that most of the pad is under my printer while the rest extends out as a home turf for my mouse. You could also just cut the pad with scissors to get the size you want.

2. Business card holders are just about the perfect size to hold a few mini disks. My local stationer has acrylic ones that sell for a little over $1.00 Canadian (about 75 cents in the U.S.). It sits quietly on top of my monitor and holds Kickstart, Workbench, my word-processing disk, and accounting programs at easy reach. I have another that keeps my data disks handy.

3. The Amiga uses the preferences, including the printer settings, from the first disk accessed since your last warm boot. This means that if you booted a program in which you haven't bothered to set the printer, and then switch to another program that uses the printer, you will wish you hadn't. For the sake of safety, it is a good idea to set the preferences on every single disk you get, as soon as you get it.

4. When running commercial software from the CLI, if the program name is cumbersome (e.g., Record Keeping for Small Business), change it to something manageable so you can boot the program without excessive labor at the keyboard. I call all my programs "D" because I've already got my finger on the d key from the control-D sequence I used to break into the CLI in the first place.

Alan Stanley
Prince Edward Island, Canada

EXECUTE REMINDERS

WHILE USING EXECUTE, I found an easy tool to remind me of the necessary statement as well as carry out the command.

First, copy the CLI icon using the Workbench or CLI COPY command. Then move it to the drawer with the program needing the EXECUTE action (e.g., when you wish to ASSIGN directories to another drive). Next, RENAME the CLI icon to an appropriate reminder such as "Execute df1 Assign". (Note: You cannot use a colon after the drive identity without getting a message asking you to insert a non-existent disk.) Lastly, using ED, create a file of the necessary commands, ending the file with an ENDCLI statement, and name the file as you named the CLI icon (i.e., ASSIGN).

When you then use that particular software, the icon reminds you of the name of the file you created. Double ►

Aussie JOKER POKER $200,000 JACKPOT



The latest multi-player multi-format PC game from Australia is different to all forms of Poker.

Aussie JOKER POKER features 90 player capacity, open-ended discard ability, selectable deck size and hands per player, password controlled gambling system with automatic accounts – and **5 free entry forms for the $200,000 Aussie JOKER POKER Contest.**

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16 Consolation Prizes of $1,000 each to eliminated Finalists	$16,000
Prize includes air travel for Finalists and their guests from the major airport to Las Vegas with two days and two nights accommodation at the Golden Nugget (approx. retail value $750 each subject to departure points).	$15,000

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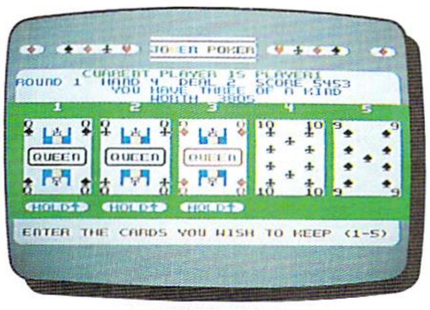
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Amiga & Atari ST	**$49.95**
Macintosh (mono only)	**$49.95**
Apple II	**$39.95**
C64/128	**$29.95**

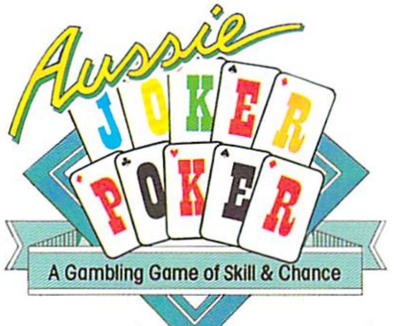
If ordering by telephone add $3 shipping & handling and check that your PC meets the minimum hardware requirements as no cash refunds apply. Warranty is limited to free replacement of faulty products returned by prepaid post.

Aussie JOKER POKER Contest Rules

1. No purchase necessary to enter.
2. Void where prohibited by state or federal law.
3. To enter, simply complete and return the the official entry form.
4. Limit five entries per family or household. Five free entry forms and full contest rules are included with "Aussie Joker Poker" or may be obtained by sending a stamped self-addressed envelope larger than 5½" × 7½" with a hand written request to: Aussie Joker Poker Contest Entry Forms, P.O. Box 22381, Gilroy, CA 95021-2381. Mail-in requests limited to one per name, household or family and must be received no later than 3/31/89. WA & VT residents need not include return postage. Full rules also available from participating Mindscape retailers.
5. Monthly entries must be received no later than the last day of the month in which a drawing will take place in order to participate in the month's drawing. Drawings will be held from December, 1988 through April 1989, inclusive. Final entries must be received by 4/30/89.
6. Contest open to legal residents of the U.S.A. and Canada (other than Quebec).
7. Odds of winning depend on number of eligible entries received.
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click on the icon and get a CLI window, then type "EXECUTE DF1:ASSIGN" and press Return. As soon as the file has been executed, the CLI window self destructs and you are ready to go.

Here is an example. Call ED, then type the following:

```
assign d: df1:userdata
assign a_pics: dh1:a_pics
assign w: df1:work
assign i: df1:icon
assign prog: df1:prog
endcli
```

Then save (Esc/x) this file as "dh1:assign". Name the CLI icon, "Execute dh1 Assign".

This example was developed for use with Acquisition by Taurus (a database program) installed on a hard drive but requiring data disks to be in df1: and containing system files to be on the data disk. That is why the a_pics assignment is to dh1: rather than df1:. I am sure that other uses could be found for this trick.

Len Herman
Schenectady, NY

Save Your Monitor

IF YOU LEAVE your computer on with an unchanging screen for a long time, you run the risk of damaging the monitor's phosphors. Because repeatedly turning the monitor on and off is hard on the picture tube, a number of screen-blanking programs have been written that will automatically darken the display after a period of inactivity. However, there is another simple way to avoid phosphor burn in, and you don't have to load a program or turn off the picture tube. Simply open the front panel on the Amiga monitor and change the video mode switch from RGB to composite. Since (presumably) you have no composite input, the screen will be blank.

Timothy Doherty
Honolulu, HI

Ultimate C-64 Emulator

NOT WILLING TO give up all my C-64 software when I got my Amiga, I was hoping that one of the 64 emulators might be the answer, but after trying them out, I was disappointed (to put it mildly). Then I came up with an idea for the ultimate C-64 emulator. Namely, keep my old 64. Since desk space is always at a premium, I just hooked up my 64 to the Amiga monitor's composite input, and my 1541 C-64 drive goes under the 1010 Amiga 3.5″ drive. When I want to use C-64 software, the Amiga keyboard slips into the "garage" (I have an A1000), the 64 takes its place on the desk, I flip the monitor from RGB to composite, and voila! Perfect C-64 emulation.

Natty Cringley
Kingston, Jamaica

Basic Boot Disk

CONSIDERING THE AMOUNT of Amiga Basic programming that I do, I found it helpful to create a self-booting Basic disk. This eliminates the time booting with another disk and the hassle of icon clicking and disk swapping involved in getting to my programs (a real bother with a one-drive system). A self-booting Basic disk also allows me to use LPRINT and SAY commands without having to access any files on my Workbench disk.

To create a self-booting Basic disk, follow these steps:

1. Make a diskcopy of Workbench.
2. Delete everything but the following directories and files:

   C (dir)
   addbuffers
   date
   setclock
   (the only commands you need are those in the startup-sequence.)
   system (dir)
   say
   l (dir)
   port-handler
   devs (dir)
   printers (dir)
   Okidata_92 (depends on the printer you have)
   narrator.device
   printer.device
   parallel.device (or serial.device if using a serial printer)
   s (dir)
   startup-sequence
   startup-sequence.hd
   libs (dir)
   translator.library

3. Edit the startup-sequence. The only command it needs to have is Amiga Basic. Or, type the name of your program in quotes beside Amiga Basic and your program will run automatically after the boot-up process. (Note: Any command used in this file must also reside in the c directory.)
4. Copy Amiga Basic onto your new Basic disk and you are done.

Another way to create a self-booting Basic disk is to run INSTALL on a formatted disk (preferably blank), and copy the directories and files (don't forget to edit the startup-sequence) mentioned above to that disk.

Danny Rodriguez
Ft. Stewart, GA

Quick Typewriter

EVEN WITH ALL the neat little features in AmigaDOS, there is no quick little typewriter feature for banging out a note on the printer. This batch file fills that gap. It turns on proportional mode and lets you type. The characters will not be printed until you press Return at the end of your line.

```
MakeDir RAM:c
Copy C:Copy to RAM:c
RAM:c/Copy C:ECHO to RAM:c
Assign C: RAM:c
ECHO ""
ECHO "Typewriter"
ECHO "by James Hicks V1.1"
ECHO ""
ECHO "Type each line you want
  printed,"
ECHO "followed by <Return>"
ECHO "When finished, press
  <CTRL-\>"
ECHO ""
ECHO > PRT: "*e[2p"
Copy * to PRT:
ECHO > PRT: "*e[1p"
ECHO ""
ECHO "Typewriter terminating . . ."
SYS:c/Assign C: SYS:c
Delete RAM:c all quiet
ECHO "Press <Return>"
Info > NIL: ?
```

Type this using ED, then Execute it. You can access the ANSI printer codes by pressing EXC, then typing the command sequence.

James Lee Hicks
Brandenburg, KY

If you have an idea you'd like to share with our readers, send it to Hors d'oeuvres, Amiga-World *Editorial, 80 Elm St., Peterborough, NH 03458. If your idea gets published, you'll receive an* AmigaWorld *surprise gift.* ■


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PROCESSOR ACCELERATOR

Go lady, go!

By Bob Lindstrom

POTATO CHIPS AND processing power—just a little of either makes you crave more. An add-on such as a 68020 processor board with 32-bit wide RAM, however, is an expensive proposition. Creative Microsystems Inc. (CMI) has an attractive alternative: comparable acceleration and number-crunching performance at a more affordable price.

The Processor Accelerator, a small daughterboard, replaces the 8MHz 68000 microprocessor in all Amiga models. It contains a 16MHz 68000 running at 14.32MHz—twice the normal operating speed—and some "traffic cop" circuitry that allows the accelerated processor to communicate with the Amiga's 7.16MHz coprocessor chips. For those who require still greater celerity, the board is socketed for an optional MC68881 math coprocessor chip and crystal oscillator. The card works with either a 12.5MHz or 16MHz coprocessor and the appropriate oscillator.

The Processor Accelerator noticeably speeds all CPU-related operations, particularly numerical calculations and ray-trace rendering. Windows snap to life more crisply, and multitasking programs assume a new operational edge. Even things as commonplace as the scrolling high-resolution text in a telecommunications program display additional smoothness. Flight-simulation fans will get giddy at the new-found dynamism of cockpit animation.

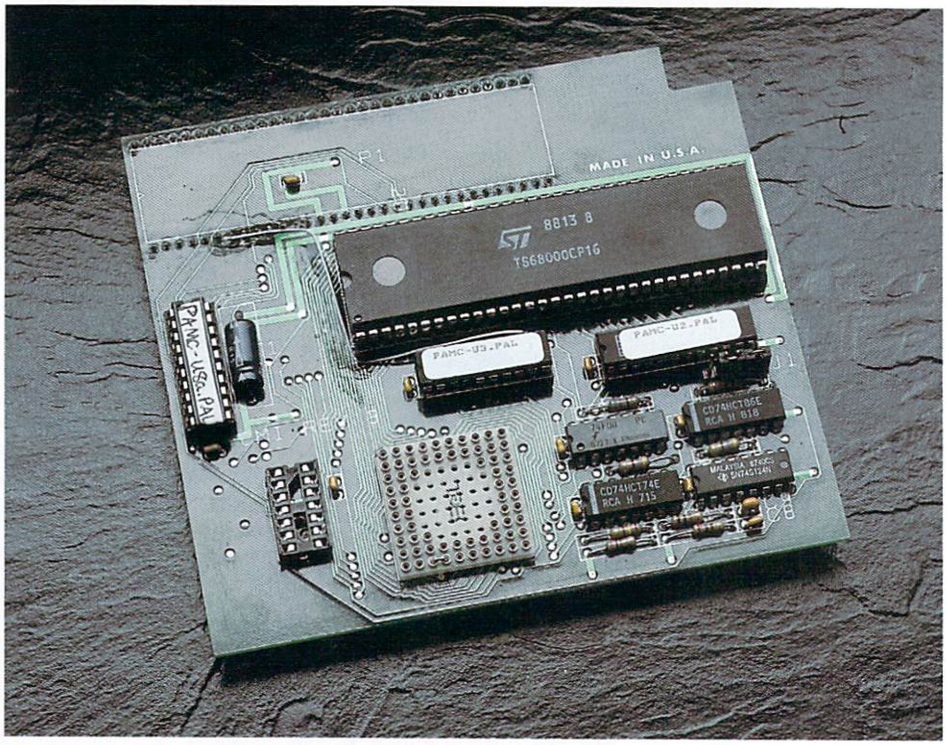
The accelerator boosts only calculations accomplished inside the central processing unit; it does not expedite disk access or the Amiga's custom coprocessors. As a result, although the processor is running twice as fast as a plain-vanilla Amiga, the board realistically increases speed by 10 to 40 percent under normal use.

GETTING GO-FAST GOING

The Processor Accelerator is available in two configurations: one for the A1000 and another for the A500 and A2000. Installation of either requires that you open the computer's case and possibly void Commodore's warranty. Nonetheless, the procedure is simple for those with a moderate share of courage and experience (if you are apprehensive, however, ask your dealer to install the board): Open the computer, remove the disk drives and metal shields, and replace the existing 68000 chip with the Processor Accelerator. To add a coprocessor, just insert the math and crystal chips into the daughterboard's sockets.

Two programs on the included utility disk activate acceleration. Togglespeed is a software switch that shifts CPU operation from normal to fast mode. I ran Togglespeed continuously without experiencing any problems with other software. The InstallMC program enables the math coprocessor chip. Here, I hit one snag: Programs prepared to access the chip would not do so unless InstallMC had been invoked during boot-up.

If you want all your software to run faster, install a jumper on-board to permanently lock-in the accelerated mode. This option is particularly useful for ►



The Processor Accelerator can boost your power without breaking the bank.

copy-protected software, which precludes adding Togglespeed or InstallMC to the startup-sequence. Enforced acceleration, however, may cause problems with some versions of the A2000 keyboard.

ON-TRACK PERFORMANCE

I ran a handful of benchmarks on an Amiga 2000 with three megabytes of internal RAM. Not surprisingly, the degree of acceleration varied depending on the type of test. Performance increases ranged from 10 percent (The Sieve of Eratosthenes with both register and memory variables) to nearly 50 percent (floating-point benchmark).

To test a 16MHz math coprocessor controlled by a 16.7MHz crystal oscillator, I ran an equation-graphing program. The unadorned A2000 drew a complete figure in 362 seconds. With the Processor Accelerator in place, rendering speed increased 20 percent—it took 301 seconds. Adding the math chip allowed the Amiga to tear through the process in a remarkable 36 seconds, for more than a tenfold improvement over an off-the-shelf A2000.

While the math coprocessor affords the greatest velocity, such results come at a cost. You can expect to pay from $150 to $175 for the math coprocessor with oscillator crystal. The coprocessor, however, goes into operation only if a program has been compiled to use the IEEE math libraries on Workbench 1.3. While little software currently supports the math chip, the socket provides an ever-ready upgrade path.

The Processor Accelerator is compatible with most existing software and hardware. I found only a few items failed with the board in place: FACC (ASDG), Diskman (the shareware file-utility program), DOS-2-DOS (Central Coast Software), the dongle for X-CAD (Taurus Software), and Live! (A-Squared). CMI has even designed the board to work properly with software that takes timing cues from the 68000 processor. Be warned, though: Some hardware configurations could cause compatibility problems not anticipated by the board's designers. Fortunately, CMI offers a six-month unconditional warranty, and the company seems to be making a sincere effort to solve incompatibility problems.

If you use your Amiga frequently in math-intensive jobs or for multitasking—even if you're just a flight-simulator buff—the Processor Accelerator is one of the most satisfying enhancements you can buy. While its effect is not as staggering as a 68020 coprocessor board with 32-bit RAM, neither is its impact on the wallet.

Editor's Note: CMI advises that Disk2Disk from Central Coast Software will not work at 14MHz either. Also, when used in conjunction with a 68000, the 68881 is more properly called a peripheral processor because it requires special interface circuitry. As this circuitry, and not the 68881 clock, is the limiting factor in 68881 performance, CMI recommends the less expensive 12.5MHz 68881.

Processor Accelerator
Creative Microsystems Inc.
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Portland, OR 97223
503/684-9300
$199.95
No special requirements.

DYNAMIC STUDIO

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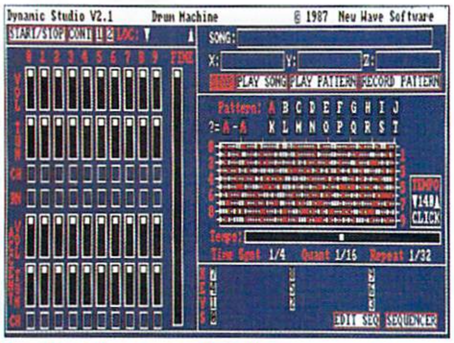
By Tim Tully

YOU NO LONGER need a heap of hardware to set up a basic MIDI studio. Dynamic Studio mitigates hardware shock by using the Amiga's sound chip to combine two essential MIDI elements—a sequencer and a digital drum machine—into one software package.

Dynamic Studio's two disks come loaded with 16 "drumkits"—sets of sampled drum sounds that you can load into the Amiga's memory, arrange in sequences, and play back as drum tracks on your sequences. The concept is great, eliminating the usual necessity of buying a separate drum box loaded with its own sounds and dedicated sequencing software (the latter being redundant in a setup with a capable sequencer). With Dynamic Studio you can record rhythm, melody, and harmony, using only one program and one synthesizer, or more, if you wish. This is an excellent way for beginners to get up and running without mortgaging the farm.

Once you load a drumkit into the Amiga, you can play each instrument with the Amiga keyboard's numeric keypad. The clear, intelligently laid-out drum-machine screen displays eight click-and-drag sliders for setting the volume, and another eight for changing the pitch (and duration) of each drum in a kit. An additional 16 sliders set the volume and tuning of accented drum sounds (same sample, different treatment), which you play by pressing a number key while holding Enter, and one assignable fine-tuning slider.

These controls are just some of the features in Dynamic Studio that give you a surprising degree of musical flexibility while minimizing the overly perfect, robotic feel that digitally precise sequencers often produce. In fact, were the quality of the drum samples better, New Wave's drum machine could be downright dangerous. As it stands, the Amiga's eight-bit sampling limitations make this a terrifically designed drum machine with so-so sounds. These drums can be great fun in the living room, but even played through a good sound system with the Amiga filter toggled off, they're not the ones to use on your next hit single.



Create striking sounds with drum samples.

ON RECORD

You record a drum track by clicking on Record Pattern and pressing the number keys (optionally, to the tick of a metronome). Link a number of these patterns together, or let the program randomize them for variety, and you've got a song. A rudimentary quantize feature places each sound on the nearest quarter, eighth, sixteenth, or thirty-second note, assuring beginners of rhythmic precision; it also lets you continuously repeat sounds on quarter, eighth, and sixteenth notes. Recorded notes appear as dashes in the Pattern Editor Window, where you can add, delete, accent, or unaccent ►



Circle 195 on Reader Service card.

notes with a mouse click or two.

Unfortunately, patterns are limited to a maximium of eight beats, and though the meters can be set anywhere from 1/4 to 8/4, all time signatures are limited to a denomination of four. While even limitations as serious as this are understandable in less-than-professional software, the manual makes things problematic by saying, "Most users, however, will never need to change its default value of 4/4 since almost all types of music use that time signature exclusively." Allowing such misleading statements to appear in a manual for neophytes is irresponsible.

You can record up to 16 tracks with your MIDI synthesizer(s)—typically, while your drum song plays—on the Sequencer screen. Here you also choose length, MIDI channel, division (similar to a "pattern" in the drum screen), and other basics, and then combine divisions into whole pieces. To fix mistakes, you can select where recording will start and end by bars, and punch in a new performance over an old one, without changing other parts.

I found some instability with the sequencer's timing. It slows noticeably if you move the mouse during playback, and even when left alone seems to lag at times.

Everybody Needs A Good Editor

One of the most important features of any sequencer is its editor. Dynamic Studio has a powerful one.

Some of the program's humanizing features instruct your Amiga to change MIDI Velocity (note volume), or channels by random values. You can "time shift" a track by as little as 1/192 notes to achieve a different rhythmic feel, or scale the speed at which the track plays. Other editing items provide echoing, transposing, or cutting and pasting notes, filtering or scaling controller data such as Pitch Bend, and rechanneling a range of keys, which is helpful in having different parts of your performance played back with different synthesizer sounds.

After you have recorded a performance, you can see each note, controller, program change, and MIDI event. You can also edit note position and length, note volume, the amount of modulation each note gets, and so on.

There are both graphic and text modes in the editing function. Each allows you to insert, delete, and change the values of notes and controllers. The graphic mode displays notes as lines on a piano-roll display where you select notes and functions, then change values by dragging a slider. The slider is not the best; sliding it to the far left or right only changes values by thirty-two, so larger edits require re-dragging. A better approach would be to let you type in values from the keyboard. The text editor lists a string of labeled MIDI data values, in hex and decimal formats, representing note status, velocity, and various MIDI events, all of which you can copy, cut and paste, or change using the slider.

Despite the slider limitations, this editor is good because it lets you fine-tune virtually everything.

The convenient librarian lets you save system-exclusive information from your synthesizers, so the sounds you used are as accessible as the data. You can save sequences to standard format SMUS files, in order to use them with other programs.

Dynamic Studio will satisfy beginners. Adding the inexpensive Ensoniq Mirage Digital Sampler (Sound Oasis—$99.95—another New Wave program, translates sample Mirage disks into editable Amiga files) will let you create better drum samples, and provides an excellent way to upgrade this flexible startup studio.
Editor's Note: As we go to press, an update of Dynamic Studio has been released. It promises twice the tempo resolution, plus abilities to trigger external MIDI instruments and read all sample files.

Dynamic Studio
New Wave Software
PO Box 438
St. Clair Shores, MI 48080
313/771-4465
$199.95
One megabyte required.

Animation: Flipper

As they say in the pulp paperback business, it's a real "page-turner."

By Wayland Strickland

TRADITIONAL ANIMATION design is a cumbersome process of drawing the intended sequence out on a number of sheets of paper. To create the animation, you must then flip the pages.

The simplified, computerized method involves digitizing each of the cells and loading them into a page-flipping program, which provides great flexibility in altering the animation. This process saves time and money by allowing you to correct mistakes before the product is transferred to film or videotape.

Animation: Flipper is designed to play back any number of cells in any order you wish. It will "flip" IFF pictures in any resolution in both overscan and non-overscan, although it does not support HAM pictures.

Let's Start Flipping

After loading Flipper, use the pull-down menus to choose what you want the program to flip. From the Storage menu you can load prerecorded scripts or save new ones. These scripts are in text format, and they contain the number of pictures to be loaded, the file names, and the amount of time the pictures are to remain on screen.

One script feature that proved puzzling is New. When you choose it, the program clears or deletes its current script from memory, but it will not permit the creation of any new scripts. The program does not lock up entirely, however, and you can still multitask with other software or with Workbench; yet, in New the only feature of the program that works is Quit.

Using Mode, select the format under which you want the animation stored: ANIM for use with other third-party software, and HASH for all Hash Enterprises animation software. Then, to compile the animation, select Pack. When you are ready to edit, bring up Edit; here you can choose from three selections: Add, Modify, and Delete.

Add brings up a file requester listing the files on df0:, df1:, HD:, and so forth. You need not repeat the selection and loading process for each picture to be flipped. Instead, simply select all of the pictures at once by touching the respective file names in the order desired, and then click the load icon.

With Modify you can select one picture at a time and adjust its delay time if

Continued on p. 64



Until now the world was flat. X-Specs 3D.

Burst the two-dimensional straightjacket that imprisons your video graphics. Enter the full-depth, full-color world of X-Specs 3D. The third dimensional stereoscopic world of human vision.

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BASIC By The Numbers

Back from a holiday hiatus, our tutorial on Amiga Basic programming continues with an examination of data files.

By Bob Ryan

64 Back to Basics

IN THE PAST month, I've received a number of letters from beginning programmers who have had trouble keeping up with the pace of the tutorials over the last four or five months. Because this is a tutorial for beginners, I've decided to concentrate for the time being on important elementary topics in BASIC programming. This month, I take a look at using data files from Amiga Basic.

65 Computer Amnesia

LIKE ALL COMPUTERS, your Amiga stores programs and data in RAM, short for random-access memory. (By the way, don't be misled by the acronym RAM. Your computer doesn't access memory randomly; rather, it calculates and uses specific addresses.) The problem with RAM is that it is volatile; its contents are destroyed when you turn off your computer. To be useful at all, computers must be able to store programs and data permanently. Providing this permanant storage is the function of disk drives.

Programs and data are stored on disks as files. If you own a painting program such as DeluxePaint II, you're familiar with the picture files that it produces. These picture files are a form of data files.

Your Amiga Basic programs can also load and save data files. (In fact, because they are loaded into the Amiga Basic interpreter, BASIC programs are data files themselves, but that's another story.) These data files can contain simple text information or graphics images such as picture files. For example, a BASIC program called LoadILBM-SaveACBM found in the Basic-Demos drawer of your Extras disk lets you load and save Amiga picture files. A properly written Amiga Basic program can read any Amiga data file.

66 Creating Files from Amiga Basic

TO DEMONSTRATE HOW you create and use data files from Amiga Basic, I'll take you through the steps needed to create a simple address-book program. This program will save a list of names, addresses, and phone numbers to disk. It will also let you retrieve information from the list.

Creating a data file from Amiga Basic is a function of the OPEN statement. The OPEN statement has two forms. I prefer to use the second syntax listed in the Amiga Basic manual, page 8-100. For example, to create a file called Address, you would enter:

```
OPEN "Address" FOR OUTPUT AS #1
```

This statement creates a file named address in the current directory. For Amiga Basic, the current directory is the one where Amiga Basic itself is located. Thus, if you start Amiga Basic from the main window of your Extras disk, the file Address will also be located in the main window of the Extras disk. If another file with the same name, whether it is a program file or a data file, exists in the current directory, it will be overwritten by your newly created file. Note that this applies only to sequential data files that you open for output. Files opened for input files and ►

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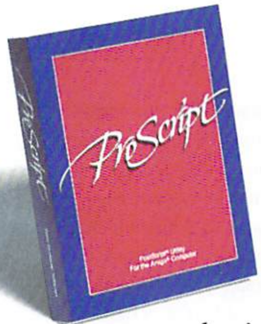
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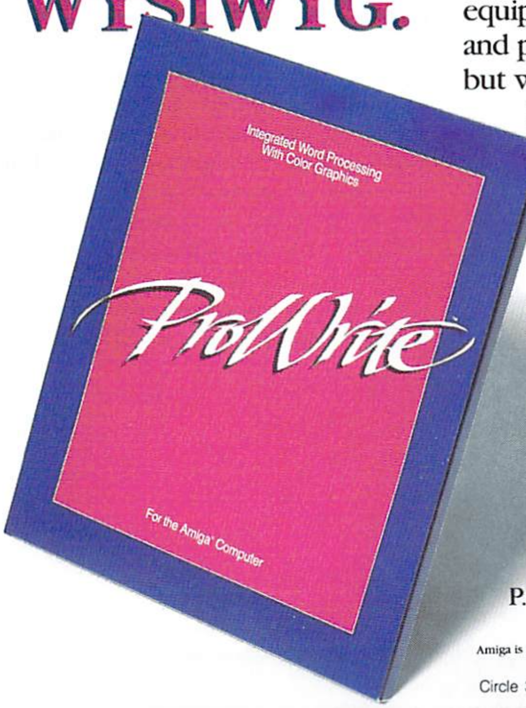


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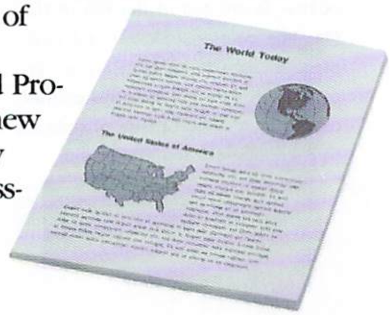


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random-access files (which we will discuss later) do not overwrite previously created files.

The word OUTPUT specifies that you are going to write to this file. If you had used the word INPUT, you would be able to read from a previously existing file. The term #1 means that you will refer to the file as file number 1 in your program.

Now that we've created a data file, we need data to save to it. Check out this simple input routine:

```
GetData:
  CLS
  INPUT "Last Name: "; last$
  IF last$ = " " THEN Finish
  INPUT "First Name: "; first$
  INPUT "Street Address: "; street$
  INPUT "City: "; city$
  INPUT "State: "; state$
  INPUT "Zip: "; zip$
  INPUT "Phone #: "; phone$
  WRITE #1, last$, first$, street$, city$, state$, zip$, phone$
  GOTO GetData
Finish:
  CLOSE #1
END
```

This input routine accepts data from keyboard entry and writes the data to the file address. The routine loops until you enter a blank carriage return at the Last Name prompt. At that point, the routine jumps to Finish, closes the file, and ends.

The important statement in this routine is the WRITE # statement. This statement writes the contents of the specified variables to the specified file. Thus, the contents of last$, first$, street$, city$, state$, zip$, and phone$ are written to file number 1, which we specified in the OPEN statement as the file Address.

You can also use PRINT #, a close relative of the standard PRINT statement, to write information to a file. I prefer WRITE # because it automatically inserts delimiters between the data items, making them easier to input from the file.

To create your own data file, you simply combine the OPEN statement with the data-entry routine and run the program. The program will then create a new file every time you run it. This is not very convenient if you wish to only add names to an already existing file. To keep from destroying the contents of the file every time you want to write to it, use the APPEND option instead of the OUTPUT option. Your OPEN command now looks like this:

```
OPEN "Address" FOR APPEND AS #1
```

This statement will still create Address if it doesn't already exist. The difference is that it won't destroy the file if it does exist; it will let you add to the file. Using this form of OPEN, run the program and create a short data file. In the next section, I present a program that reads and manipulates the data.

67 Reading Data

TO GET INFORMATION from a data file, you have to use the OPEN statement once again. For example:

```
OPEN "Address" FOR INPUT AS #1
```

prepares the file Address for reading. Reading a file doesn't change the contents of the file, it simply transfers copies of the data from disk to RAM.

When you open a file for input, a pointer is created at the top of the file. The pointer indicates the next piece of data to be read. When you read data from the file, the pointer moves to the next piece of data until it encounters the end-of-file (EOF) indicator. Thus, the file is read sequentially from top to bottom. It is thus called a sequential data file to differentiate it from a random-access data file, which lets you jump around in the file.

Once opened, you read from a file using the INPUT # statement. Here is an example of a routine that reads the contents of our Address file into an array, where you can then manipulate the data.

```
OPTION BASE 1
DIM lst$(100,7)
OPEN "Address" FOR INPUT AS #1
WHILE NOT EOF(1)
  rec = rec + 1
  FOR fld = 1 to 7
  INPUT #1, lst$(rec,fld)
  NEXT fld
WEND
CLOSE #1
```

This routine reads the data from the file into a two-dimensional array that can store seven different pieces of information on 100 people. The number of the current person is stored in the variable rec (for record). The fld (for field) variable indicates which part of a person's record is being read. Note that this routine crashes if your file contains more than 100 names. I will discuss ways around this limitation in future columns on error trapping. For now, you can increase the size of the array to accommodate more records.

Once you have the data in memory you can manipulate it. You can display all the data, search for the information on a particular person, sort the data by any of the fields, and send the data to your printer. I'll get into all this next month when I examine text manipulation in depth. For now, I'll leave you with a routine that displays all the data in Address.

```
FOR x = 1 to rec
FOR fld = 1 to 7
PRINT lst$(x,fld); " ";
NEXT fld
PRINT
NEXT x
```

Combine this with the data-reading routine and you can view the contents of Address. Next time, we'll make the data more useful by letting you perform more powerful data manipulations. ■



AN AMIGA STARTER KIT

Everything You Didn't Think You Needed To Know (Or Buy!) When You Plunked Down All That Money On Your New Amiga Computer System.

FACED WITH a bewildering array of hardware and software products, new Amiga owners cry out for help in making the proper decisions. *AmigaWorld* responds!

Life used to be easy for new Amiga owners. Decisions about what software and hardware to buy were made simple by the fact that there was very little software and hardware to buy. The worm has turned, however, and the abundance of Amiga software and hardware products has made the job of outfitting your new computer a daunting and confusing task. In the following two sections of this special feature, two experienced Amiga users make their recommendations about the software and hardware they think will best benefit a new Amiga owner.

The products described below are not necessarily the newest, best or most powerful in their class. They are products that are relatively inexpensive and easy to use, and that have performed well for thousands of Amiga owners. You may do better than to assemble your Amiga Starter Kit from the products listed here, but you won't go wrong if you choose to follow our recommendations.

Editor's Note: For further information about products mentioned in either section of this article, consult the Product Information box at the end of the entire feature. Also, in previous issues of *AmigaWorld*, we have published roundups or comparative reviews of various types of products. In such cases, there is a citation of the article at the end of each section should you wish to read about the product, and its competition, in more depth. For individual reviews of products, check our "Index of Articles and Reviews," which appears every January and covers the previous year's issue. ►

BY SHELDON LEEMON AND BOB RYAN

ILLUSTRATED BY TAMAR HABER-SCHAIM


THIS SIDE UP

AMIGA STARTER KIT—
SOFTWARE

By Sheldon Leemon

STARTING OUT "SOFTLY". . .

TRYING TO BUY your first software packages presents the same Möbius strip of a problem as trying to land your first job. Without experience you cannot get a job, but without a job you cannot get experience. By the same token, without software you cannot use your new computer, but without using your computer for a while, you cannot decide which is the best software to buy.

You could ask your friend the computer wizard for recommendations, but programs that are right for a seasoned veteran do not necessarily fit a rookie's needs. To help you untangle the problem, I have put together a starter kit of the best introductory programs in six commonly used software categories—word processors, databases, spreadsheets, home-finance programs, graphics programs, and games.

Right Kind of Writer: Word Processors

Everybody who owns a computer writes something—resumés, letters, business reports, or school papers. To write with a computer you need a word processor, a program that lets you enter, manipulate, format, and print text. Using a computer to prepare documents is much more efficient than using a typewriter. Basic word processors let you correct mistakes before they are printed, and to move paragraphs from one part of the document to another without retyping. Word processors also allow you to store your documents on disk, so you can retrieve and reuse your work later, without keying it in again. The computer makes fine tuning, such as changing margin settings and line spacing, easier. You can print multiple configurations of the same document without retyping.

More powerful word processors include a spell-checker that flags for misspelled words and suggests correct spellings. Many advanced programs automatically generate footnotes, indices, and tables of contents. Because of the Amiga's graphics capabilities, many word processors let you insert graphics, such as maps, graphs, or custom logos, into your document.

KindWords ($100) from The Disc Company is a good first word processor. Besides letting you type, edit, and print simple documents, KindWords allows you to mix text and graphics on the same page. You can import 16-color IFF (Interchange File Format, the standard Amiga format) graphics into a document and then resize, crop, and move the image.

If you want to create documents with lots of graphics and color, however, the better choice is ProWrite ($125), a graphically-oriented word processor from New Horizons. It has the best support for mixing a variety of color fonts with graphics. You can import any resolution IFF or 4096-color Hold-and-Modify (HAM) image and wrap your text around the picture.

For very long, text-only documents and top-of-the-line features such as footnotes, table-of-contents generation, auto-hyphenation, and a thesaurus, the clear choice is WordPerfect from WordPerfect Corp. List price for the Amiga version is a hefty $395, but it is commonly sold for as little as $225–$250. WordPerfect offers some little-publicized promotions, permitting students, teachers, or users' group members to purchase the program for a mere $125–$150 (contact WordPerfect dealers for details). Be warned, WordPerfect will be a challenge to the rank amateur. The program's excellent documentation, good tutorial, and extremely helpful telephone support, however, will make learning easier. *(See "The AW Word Processing Roundup," p. 49 in the October '88 issue for a comparison of word processors. "And The Word Was Made Perfect," p. 18, in the December '87 issue offers a feature-length review of WordPerfect.)*

Electronic Filing Cabinets: Databases

If you need to organize and keep track of things, you should invest in a database program. Like filing cabinets, databases store and sort information, generally text, for later retrieval. You can use a database to organize your record collection, a mailing list, or your store's stock. Keeping records in a database is a lot handier than stuffing file folders. The computer will sort or retrieve information based on custom criteria. For example, you can search through a mailing list for all entries bearing the last name of Smith, or for all records with the zip code 98206, or for all records with the zip code 98206 and a street name that contains the letter combination "dale." Databases also let you print the stored information in a variety of ways. You can take the same collection of names and addresses and print mailing labels or a list of telephone numbers. Most databases allow you to print







Program selections from six popular categories to get your Amiga software library off the ground.

your list of names and addresses to a file on floppy disk for mail merging. A word processor with mail merge capabilities will combine automatically the address file with a document file, and print the same letter to a whole list of people, changing the name and address on each letter.

Superbase Personal by Precision Incorporated is an exceptional value for the new user. It is full-featured and easy to use, yet at $80 it is one of the least expensive databases available for the Amiga. Not only can it store a huge number of text records, but it can store pictures as well. Because Superbase Personal is part of a family of databases from Precision Software, you can upgrade to more powerful versions, without sacrificing your initial investment, when you need more advanced features, such as relational sorting and macros for automating repetitive tasks. *(See "Ducks in a Row: A Roundup of Amiga Databases," p. 24 of the September '88 issue for a comparison of databases.)*

LEGAL NUMBERS SHEETS

To keep track of and manipulate numbers you need a spreadsheet, a sort of database for figures. Spreadsheets not only can record numeric information, but also can perform complex mathematical calculations on the values to determine correlations and make projections. Spreadsheets are divided into rows and columns of boxes called cells. Each cell can store a number that you enter from the keyboard, or that the program calculates by performing one or more mathematical operations on numbers in other cells. The ability to define complex relationships among a group of numbers is the real strength of the spreadsheet, illustrating how changing one value can affect other related values. Spreadsheets can also generate graphs based on the numbers they store. You can use a spreadsheet for simple tasks such as balancing a checkbook or for more complex chores such as maintaining complete financial records for a business, or doing tax returns.

Two full-featured spreadsheets for the Amiga are Maxiplan 500 from Oxxi, and Analyze! from Micro-Systems Software; both offer a lot of power for about $150. You can even graph your figures in two or three dimensions and in an array of colors. For those who like to bring their work home, Analyze! can read and write files in Lotus 1-2-3 format. Maxiplan 500 is the choice for serious number-crunchers, however, because it offers an upgrade path to Maxiplan Plus, an even more powerful package with extensive mathematical, trigonometric and financial functions, plus a macro feature. *(See "The Numbers Game," p. 51 in the February '88 issue for a comparison of spreadsheets.)*

BALANCED BUDGETS: HOME FINANCE

To the home user who wants only to manage the household finances, not the profit and loss schedules for Coca-Cola, a personal accounting program would be easier to use than a spreadsheet. Tailored to a specific application, personal accounting programs help you balance your checkbook, and keep track of income and expenses.

At $90, PHASAR from Antic Software is one of the least expensive yet most complete packages. It not only lets you set up a budget and see how well you stick to it, but also helps you calculate your income taxes and net worth. Best of all, PHASAR is easy to use, offering a number of shortcuts to avoid retyping frequent entries.

BUNDLES OF PRODUCTIVITY

If you want to purchase all your productivity software at once, or are on a tight budget since you bought your new machine, software bundles are a bargain. Currently, two packages combine a word processor, a database, and a spreadsheet in one box. The Works!, a collection of programs from Micro-Systems Software, includes Scribble! (the word processor), Organize! (the database), and Analyze! (the spreadsheet). Because the programs all come from the same manufacturer, they have the same look and feel. Once you have mastered one of the programs, you can learn the others easily. At $200, the whole package costs only $50 more than Analyze! alone. The second package, The Critics Choice, combines three programs from different manufacturers. The word processor is The Disc Company's KindWords; the spreadsheet is Oxxi's Maxiplan 500; and the database is Software Visions' MicroFiche Filer, which stores and retrieves its records in a microfiche-style format. At $250, The Critics Choice costs a bit more than The Works! and ►

lacks a unified user interface. Nonetheless, it includes three fine products, two of which can be upgraded to more powerful versions (MicroFiche Filer Plus and MaxiPlan Plus). The upgrade path makes The Critics Choice a package worth considering.

On the Right Side

Just as the human brain is split into a reasoning-oriented left side and an imaginative, creative right side, the Amiga's centeral processing unit has a hard-core, data-manipulation side and an artistic side for graphics and music. While serious data-management applications are a good way to rationalize a computer purchase, the Amiga's fabulous graphics capabilities make it great fun to use for art and entertainment.

One of the first creativity programs for the Amiga was DeluxePaint, a revolutionary painting program from Electronic Arts. Almost three years later, DeluxePaint II is still high on the list of software that every user should own. It has a superb collection of drawing tools and supports all resolutions and graphics modes, except HAM and Extra_Halfbrite (64- ►

THE REFERENCE SHELF

WHEN YOU ARE learning a new subject, a private tutor can save you time and frustration. It can also cost a lot of money. The next best solution is a good book. New Amiga owners have a modest library of books to lead them through learning the CLI, Workbench, and the machine's capabilities.

If the *Introduction to the Amiga* that accompanied your machine left you confused, *The Beginner's Guide to the Amiga* by Dan McNeill ($16.95, Compute! Books) is a good primer. The Beginner's Guide concentrates on much of the same material as the Commodore manual, but explains in depth terminology that the manual assumes the reader understands. In addition, the book gives an overview of software categories and offers Amiga recommendations.

Amiga for Beginners by Christian Spanik ($16.95, Abacus) covers similar ground to Commodore's and Compute!'s books, but goes a few steps further. In addition to set-up instructions, a file-by-file description of the Workbench disk, and CLI tips, the book features a chapter on Amiga Basic programming. Command definitions and four sample programs help you get started.

If you are not ready for programming, but want to get deeper into the system than the Workbench, you might want to study a copy of *The AmigaDOS Manual, 2nd edition* by Tim King and revised by Jessica King ($24.95, Bantam Books), *The Amiga Companion* by Rob Peck ($19.95, *AmigaWorld*), or *AmigaDOS Reference Guide* by Arlan R. Levitan and Sheldon Leemon ($16.95, Compute! Books). A compilation of the three AmigaDOS manuals supplied to registered Amiga developers (*AmigaDOS User's Manual, AmigaDOS Technical Reference Manual,* and *AmigaDOS Developer's Manual*), *The AmigaDOS Manual* is considered the standard reference for AmigaDOS 1.2. The User's section combines step-by-step descriptions of CLI activities with complete command definitions, including format and template structures. Commands for ED and EDIT, AmigaDOS's screen and line editors, are also detailed. The Reference and Developer's sections move on to weightier topics, such as the macro assembler, the linker, binary file structure, and AmigaDOS data structures. *AmigaDOS Reference Guide* offers definitions and examples of AmigaDOS 1.2 commands. To help you create batch files, the book explains ED and EDIT. *The Amiga Companion* walks you through all AmigaDOS 1.2 commands, and is the only book of the three to discuss AmigaDOS 1.3. The book also contains a few extras, such as a chapter on public-domain software, a question-and-answer chapter on common Amiga concerns, and a list of users' groups.

The Amiga Handbook by Markus Breuer ($24.95, Progressive Peripherals & Software) puts the Amiga under a microscope. Beginners will appreciate the four chapters on the Workbench, one of which is devoted totally to the mouse, menus, and windows. More experienced users can skip ahead to the chapters on the custom chip set, graphics, sound, and programming. Published in 1986, the book is now dated. Although the AmigaDOS and CLI coverage is extensive, the Handbook discusses version 1.1 only, and all hardware references apply only to the Amiga 1000.

Once you are comfortable with your system, you can start concentrating on applications and better performance. Two sources worth investigating are *1001 Things to Do with Your Amiga* by Mark Sawusch and Dave Prochnow ($12.95, Tab Books) and *Amiga Tricks & Tips* by Bleek Maelger Weltner ($19.95, Abacus). Among the 1001 things suggested are games, business, finance, mathematical, statistical, and educational ideas and applications. The book offers completed programs for you to type in and run, plus routines and techniques you can incorporate into your own programs. For the adventurous, there is a chapter on networking and artificial intelligence. *Amiga Tricks & Tips* is a compendium of helpful hints. While it includes chapters on the CLI, Workbench, and icons, the bulk of the tricks and tips are devoted to Amiga Basic and C programming. Advanced chapters discuss accessing the dos.library and Intutition, graphics programming, and error trapping. □

—Linda Barrett

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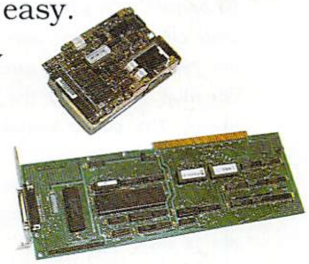


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color) modes. Even if you have no artistic talent, the program makes creating good-looking graphics easy. Design your own business signs, logos, and posters. At $130 the program is not cheap, but it performs such a wide range of tasks, from creating signs to editing icons to painting gallery-ready art, that the price is easily justified.

If you plan to use your Amiga primarily for graphics and it has at least one megabyte of memory, you should invest $20 more to buy Deluxe PhotoLab (Electronic Arts), which combines the best features of a slew of graphics software into its three modules—Paint, Colors, and Posters. Paint has most of the features of DeluxePaint II, plus support for HAM and Extra_Halfbrite modes. If you have enough memory, you can work on several pictures at once, in different resolution modes, and cut and paste among them. Picture size is restricted only by memory, meaning Paint is the only Amiga program that can create a HAM image over 352 pixels wide. Colors, the second module, allows you to perform image-processing functions such as resizing and rearranging the colors in a picture. Posters lets you print pictures in sizes ranging from a few inches to over 10 feet.

TIME OFF FOR GOOD BEHAVIOR

Perhaps the hardest decision for a new Amiga owner is which program to choose from the flood of games. As with music, the "best" titles are largely a matter of taste. Arcade-quality games, priced mostly from $25 to $40, top the charts then disappear every few weeks. Some games, however, manage to make a lasting impression. In the sports category, Electronic Arts' Earl Weaver Baseball stands out. You can play it as an arcade game, or as an extremely realistic statistical simulation in which you control a variety of managerial decisions. In the arcade category, Marble Madness (Electronic Arts) and Emerald Mine (Constellation Software) offer fast action that never grows old. For the frugal, Electronic Art's Awesome Arcade Pack I provides three fine arcade games for the price of one. For graphics adventures, Micro-Illusions' Faery Tale Adventure and Electronic Arts' Bards Tale series are perennial favorites. Flight sim- ►

SOMETHING FOR NOTHING

A GREAT WAY to expand your software collection without depleting your bank account is by filling it with some of the fine, noncommercial (noncopyrighted) software that is freely distributed by Amiga owners. Fellow Amiga users donate these programs as a public service in two ways, as shareware and public domain (PD) software. Programmers offer shareware disks for free, but request that you send them a donation if you find the software useful. The public domain is a library of software that you can access, copy, and distribute for free. None of the disks or individual programs are copyrighted.

Because of the Amiga's strong appeal to programmers, its catalog of PD software and shareware is quite large. Applications programs, such as Uedit—Rick Stiles' fine shareware text-editor and word processor—and the excellent spreadsheets, AnalytiCalc and VC, immediately come to mind. Keith Young's Access!, a communications program, rivals the quality of the best commercial terminal packages. You can find plenty of PD and shareware games, from arcade classics such as Amoeba Invaders (Space Invaders), Pong, and Asteroids, to graphics adventures such as the Software Distillery's Hack and Larn. To organize and manipulate disk files, check out Tom Rokicki's DEC, which replaces the AmigaDOS DiskCopy and Format commands with a small, mouse-driven program, and such file managers as DirUtil, DU, and Jobs, invaluable aids particularly if you have a single-drive system. Some of the free programs provide solutions to problems that are not addressed by commercial programs, such as D. J. James' Fixhunk program, which converts older programs written for Amigas with only 512K to run on machines with expanded memory, or StealMemBoot, which works on autobooting programs. AssignDev lets you call your external A2000 disk drive df1: instead of df2:, and DefDisk lets you assign all logical devices to your hard drive with one command. Often the source code for a program is also included on the disk, so you can get a program and programming tips all at once.

You can obtain freely-distributable software from several sources. If you have a modem and telecommunications software, you can transfer these programs over the telephone lines from bulletin-board services or commercial information services, such as CompuServe (800/848-8199, 614/457-8650 in Ohio), GEnie (800/638-9636), and PeopleLink (800/524-0100). Although dial-up electronic services tend to get the latest software very quickly, using them can be hazardous to your bank account; telephone bills and on-line charges accumulate quickly. A more economical approach is to gather your programs a disk at a time. An excellent source is users' groups, which often establish club libraries of PD and shareware disks. Ask your Amiga dealer about a club in your area. If you cannot find a club, you can obtain disks from some nationally-known sources, such as Fred Fish's Amiga Library (1346 West 10th Place, Tempe, AZ 85281), one of the largest, the *AmigaWorld* Public Domain Library (80 Elm St., Peterborough, NH 03458), and the Amicus Library (PO Box 869, Fall River, MA 02722), or from commercial copying services. The commercial services sometimes stock a number of different PD-disk collections and charge a minimal fee, about $5, to cover their costs for copying, shipping, and handling.

The price is certainly right for freeware, but it comes with a guarantee as large as its price—none. While most programs work well, you may find a lemon occasionally. When you do not pay any money, you do take a chance. Because the programs are released into the public domain by individuals, do not expect extensive documentation or customer support. For the most part, you are on your own.

If you never used a computer before buying your Amiga, you should probably avoid the public domain until you are comfortable working with well-documented programs and your machine. If you are a risk taker who thinks manuals are for wimps, freeware could be just what you and your stretched budget are looking for. □ *—SL*

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THE PRO SHOP

IF YOU HAVE previous computer experience or want to integrate your new Amiga into your studio (publishing, graphics, or music), you should skip the beginner's section and start browsing on the professional end of the shelves.

On the productivity side, serious authors should invest in WordPerfect (WordPerfect Corp.) immmediately, while database users who need specialized relational sorts on large volumes of records should buy the fully-programmable Superbase Professional (Precision Inc.). Spreadsheet users with a passion for power should check out MaxiPlan Plus (Oxxi).

If you want to access your business computer from home, or log onto any of the on-line services, you will need a modem (see the Hardware section of this Starter Kit feature) and the telecommunications software that will allow you to communicate with mainframe computers, and to send programs and data files over the phone lines to other users. You can catch up on Amiga gossip and download the latest public-domain software and demos from users'-group-operated bulletin board services and the Amiga special interest groups of such commercial information services as CompuServe, GEnie, and PeopleLink. Two of the best commercial terminal packages are Online! (Micro-Systems Software) and A-Talk III Plus (Oxxi). Because telecomputing is a popular means of spreading non-commercial software, you can find many good telecommunications programs in the public-domain and shareware markets. (See the sidebar "Something for Nothing," which also accompanies this article.)

If you would rather communicate in print via a newsletter, a good desktop-publishing package will get your print shop running. Desktop-publishing software lets you compose professional-looking newsletters and brochures rivaling those of typeset quality. The choice in high-quality publishing systems is Gold Disk's Professional Page. It allows you to compose text and graphics on the spot, or to import them from word processors, paint programs, and structured drawing programs. For the best quality output, however, you will need to invest in a PostScript-compatible laser printer or send your disk files to a typesetting service.

For those who express themselves better on the screen than on paper, the Amiga supports a wealth of video-related software. Three packages are particularly helpful for setting up your video studio. For character generation, Pro Video Plus from JDK Images turns the Amiga into a titling system rivaling expensive stand-alone units. You can use Pro Video Plus to overlay titles on top of video images, and move them on and off screen with various special effects, such as slides, wipes, and fades. The program is quick to respond, because it retains all data in memory, rather than reading it constantly from disk. With Video Effects 3D from InnoVision Technology you can create animated logos and 3-D titling effects from ordinary bitmap images that you create with a paint program. You load the image, specify how you want it to move or rotate, and the program creates an animation file that shows the motion. To round out your video studio, Deluxe PhotoLab from Electronic Arts works like a paint box, letting you add computer-generated graphics to a video image. Videophiles should note that these programs require a lot of memory, 1.5 megabytes in the case of Pro Video Plus.

For straight graphics animation, you have the choice of two or three dimensions. For producing simple two-dimensional animations, which look like flat cartoons, Broderbund's FantaVision is a real bargain at about $60. You draw a 2-D picture in one frame, draw it in a different size, shape, or position in the next frame, and then the program draws a series of intermediate frames to give the illusion that the object is moving or changing shape. Because of its simple user interface, you will be able to get things moving within minutes of starting to use the program. At the other end of the spectrum are the extremely realistic looking 3-D animations produced by programs such as Sculpt-Animate 4D from Byte by Byte. These programs require you to create three-dimensional objects composed of a series of triangular planes. You can build the objects by drawing them one point at a time, or by combining basic geometric shapes such as spheres, cones, cylinders, and boxes. The computer will draw the finished object from any distance or angle. You can even control such lighting effects as shadows and reflections. Although it takes a while to get used to designing 3-D objects, and it can take even longer to draw each scene, the programs rival output from high-end graphics machines costing hundreds of thousands of dollars.

For the musically inclined, the Amiga offers two popular types of music software: note-entry programs and MIDI-sequencer programs. Electronic Arts' Deluxe Music Construction Set lets you compose by entering notes on a staff, using traditional music notation. You can play your compositions using the Amiga's internal sound generators or through external digital instruments. On the other hand, sequencer programs such as Dr. T's KCS and Mimetic's SoundScape Pro MIDI Studio let you enter your compositions directly from a keyboard or other instrument equipped with a Musical Instrument Digital Interface (MIDI) port. KCS is oriented towards use from the computer keyboard, while SoundScape provides more Amiga-specific controls.

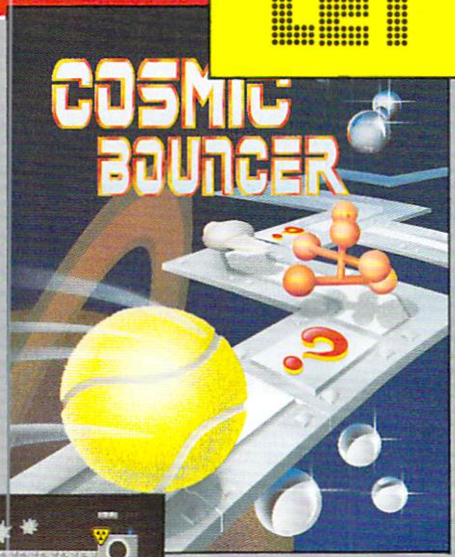
Whatever your forte, the Amiga is an able assistant to have around the studio. □ *—SL*

ulators never go out of stlye; two of the best are subLOGIC's Flight Simulator II and Electronic Arts' F/A-18 Interceptor. Integrating spectacular sound and graphics with some very interesting games, Cinemaware's The Three Stooges and Rocket Ranger belong on the shelf of every Amiga gamester. *(See "*AmigaWorld *Top 40 Games," p. 28 in the November '88 issue for a countdown of the editors' favorites.)*

Building a software library is a big job, but, fortunately, you do not have to complete it all at once. The software packages mentioned above will get you started with your computer and keep you busy for many hours. By starting with a couple of basic programs, and learning how to use them, you will not only start enjoying your Amiga right away, but also begin learning the types of software you like and the specific features you require. With a little experience, the next shopping trip will be even easier and the results just as satisfying. ■

Sheldon Leemon is the author of Inside Amiga Graphics *and other books, and he is a frequent contributor to many computer publications. Write to him c/o* AmigaWorld, *Editorial Dept., 80 Elm St., Peterborough, NH 03458.*

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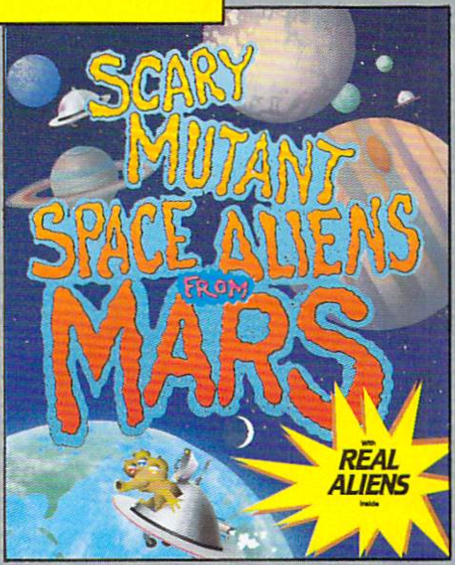
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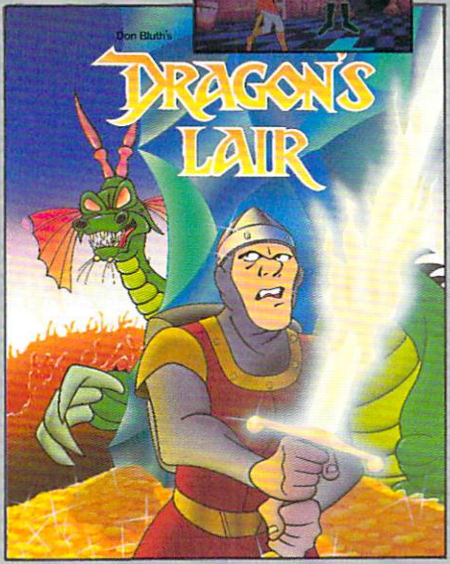
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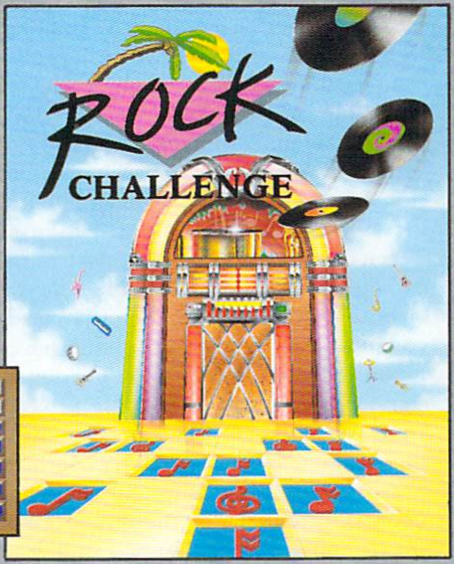


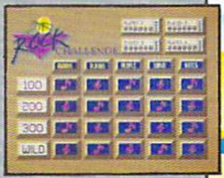


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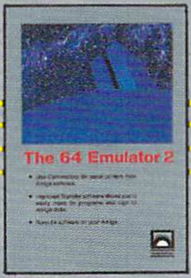
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AMIGA STARTER KIT—
HARDWARE

By Bob Ryan,
AmigaWorld Technical Editor





. . . BUT SOON YOU'LL HIT THE "HARDER" STUFF

IN ITS BASE configuration, your new Amiga—be it an A500 or an A2000—is a very powerful machine. It contains enough memory to allow you to run several programs simultaneously, and enough disk space to store a great deal of data. As you become familiar with the Amiga, however, you will probably find your base machine is too confining. You will grow tired of swapping disks and yearn for the flexibility of massive amounts of memory. Here in the hardware section of our Starter Kit, we will review the expansion options available to you and point out products that beginners should find easy to install and use.

You can hook two types of devices to your Amiga: expansion devices and peripherals. Expansion devices tie directly into the internal hardware of your computer. In technical terms, they have direct access to the address and data buses of your Amiga. Expansion devices normally increase a basic resource of your system, such as memory or disk storage (although some expansion devices perform other functions, such as tying your computer into a local-area network or enhancing the display characteristics of your computer). The first part of this article concentrates on memory and disk expansion options for new Amiga 500 and 2000 owners.

Periherals do not have direct access to your computer's innards. They attach to your computer via ports and provide capabilities, such as printing and digitizing, that do not require direct access to your Amiga's buses. The second part of this article deals with peripherals for the Amiga.

Memory and Storage

Without doubt, the most important resource in your Amiga is memory. The Amiga needs lots of memory in order to fit multiple programs into memory. While the Amiga is multitasking, it is not a virtual machine: A program must be in memory in order to run. In addition, any memory in your machine beyond the first 512K will free up chip RAM, allowing you to store more pictures and sounds in memory at once.

Aside from memory, your Amiga's next most important resource is disk space. Both the Amiga 500 and the 2000 come with one floppy-disk drive that holds 880K of programs and data. A second floppy disk doubles the amount of on-line storage available to you and eliminates tiresome disk swaps when you back up your disks. The ultimate storage device, a hard-disk drive, greatly speeds up program loading and saving and significantly increases your on-line storage capacity.

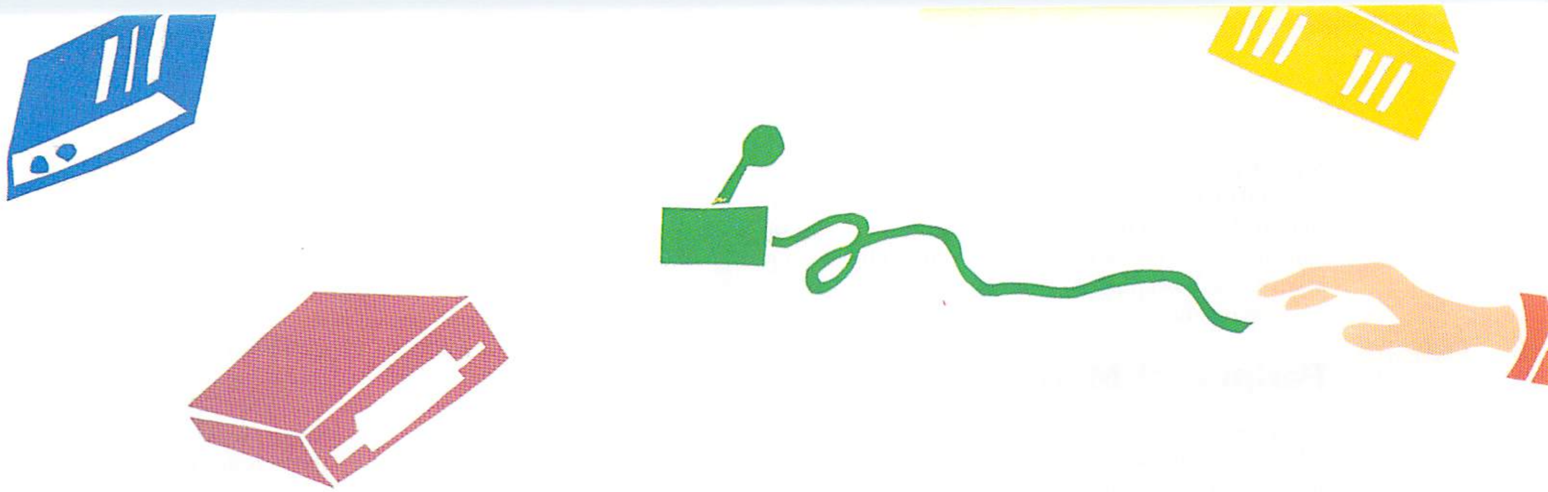
For most people, the most vexing expansion question is whether to first expand memory capacity or disk capacity. For Amiga 500 owners, my answer is clear: Expand memory first. Your first purchase should be Commodore's A501 Memory Expansion Card or an equivalent card from any number of third-party manufacturers. You insert the A501 into the compartment on the underside of the Amiga 500. Only after upgrading your machine to one megabyte should you buy a second floppy-disk drive. Ideally, of course, you should buy both.

Because the Amiga 2000 comes with a megabyte of memory standard, further memory expansion is not as pressing as with the A500. An Amiga 2000 owner should buy a second floppy drive before investing in further memory expansion.

What is the best floppy drive to buy? In most cases, I would say buy the cheapest. I have used the Commodore 1010 drive, the Progressive Peripherals ProDrive, and the Oceanic America Master-3A, and found all three to be very reliable.

One Step Beyond

Once you have what I call a standard Amiga—a megabyte of memory and two floppy-disk drives—you can start thinking about further expansion. Once again, the question is whether to go with more memory or more disk storage. The answer depends upon your primary application. If you are essentially a home-hobbyist user, you can get by easily with a standard



Amiga expansion devices and peripherals to help you break out of the "basic-box" configuration.

Amiga. If you want to do heavy-duty graphics or video work, expand memory first. Word processing and database management will benefit most from the addition of a hard-disk drive. Once again, the optimum solution is to further expand both memory and disk storage, but as large-capacity memory boards and hard-disk drives are expensive, you will probably have to settle for one or the other.

Memory expansion on the Amiga 2000 is easy: You simply buy a memory expansion card and plug it into an expansion slot. I recommend memory cards from ASDG and Progressive Peripherals. These manufacturers have a proven track record in providing high-quality memory expansion. If, however, you want to buy the latest and greatest, check out the 8-Up! from Microbotics. I have yet to use this new, innovative 8MB memory card, but on the other hand I have yet to see a bad product from Microbotics.

Note that boards you buy for the Amiga 2000 should conform to the Zorro II expansion standard, which eliminates the need for DIP switches and extensive configuration utilities. Zorro II boards are auto-config, meaning the system recognizes them automatically. The only instances where it is not specifically necessary to use Zorro II boards are when a board uses the CPU slot or the video slot. The CSA Turbo boards are an example of the former, and the MicroWay flickerFixer exemplifies the latter.

Memory expansion beyond 1MB is a more clouded issue on the Amiga 500, with some companies offering internal expansion boards and others offering external devices. If you are new to the Amiga, I recommend you stay away from the internal expansion devices—they are more difficult to install than external devices and will void your warranty. The best external memory device for the Amiga 500 is the Microbotics Starboard 2/500.

Hard and Fast Options

As compared to the early days of the Amiga, hard-disk options are plentiful and relatively inexpensive, especially for the Amiga 2000. A hard-disk system consists of a controller and the disk itself. As hard disks are fairly standard, you will normally buy the controller separately from the drive itself. Controllers come in two flavors: those that control ST-506 (read IBM-style) drives, and those that control SCSI (Small Computer System Interface, pronounced "scuzzy") drives.

The best all-around hard-disk controller is probably the A2090-A from Commodore. This high-speed controller can handle two ST-506 drives and up to seven SCSI devices at the same time. It autoboots under Workbench 1.3 and offers more versatility than any other controller. On the minus side, the A2090-A is a fairly expensive controller.

Most other controllers for the Amiga 2000 are SCSI controllers. Near the top of the line is the Microbotics HardFrame/2000. Like the A2090-A, this high-speed controller is autobooting and can control seven SCSI devices. It can also mount a 3½-inch drive directly on the card, saving an internal mounting space and turning the card into the equivalent of an IBM hardcard. Because it does not include an ST-506 capability, the HardFrame/2000 is also considerably cheaper than the A2090-A.

Quality hardcard capability is also available from Great Valley Products (GVP). Its 20MB and 45MB Impact HC cards are complete SCSI, autobooting systems. Another innovative GVP controller is the Impact A2000-2/0. This autobooting SCSI controller contains sockets for 2MB of one-megabit memory chips. This card is ideal if you plan to add both memory and a hard disk to your system. It is the card that I have in my Amiga 2000.

If the above products are beyond your budget, check out the hard-disk controllers from C Ltd. and Supra Corp. Although these may lack some of the features or performance of the above controllers, they are more affordably priced.

Many companies also offer complete hard-disk systems for the Amiga 500. My favorites are the ►

SupraDrive from Supra Corp. and the Impact A500-SCSI/HD from Great Valley Products. Both of these hard-disk systems for the A500 include an expansion slot allowing for additional memory upgrades to your system—thus keeping the door open for future memory expansion.

Peripheral Matters

The most important peripheral in your system is your video monitor. Most people simply buy a Commodore 1084S when they buy their A500 or A2000. This was a good choice in the past, but with the Amiga's Enhanced Chip Set (new Agnus and Denise chips, controlling graphics display and memory addressing, respectively) on the horizon, you have to think ahead.

The 1084S works fine with all current Amiga graphics modes. Sometime in 1989, however, you will be able to upgrade your Amiga with new Agnus and Denise chips. In addition to expanding potential chip RAM to 1MB, the upgrade provides a non-interlaced, four-color, hi-res display mode. This new mode eliminates flicker but requires a monitor that has a scan rate of 31.5KHz. Because the 1084S is limited to 15.5KHz, its owners will not be able to make use of the flicker-free graphics mode provided by the Enhanced Chip Set.

Commodore has announced a bisync monitor that scans at both 15.5KHz and 31.5KHz, but it is not yet available. The best solution is to buy a multiscanning monitor, so called because it adapts its scan rate to the frequency of the input signal. Good multiscanning monitors for the Amiga are the Princeton Ultrasync, NEC Multisync, and Sony Multiscan. (Be sure your dealer includes the proper cable if you buy a non-Commodore monitor for your Amiga.) Although you do not need a multiscanning monitor to use all the currently available graphics modes, you will come out ahead if you buy a multiscanning monitor when you first buy your Amiga, rather than buying a 1084S and having to buy a second monitor in the future. Of course, if you think you can live without the four-color, non-interlaced, hi-res mode, the 1084S is just fine.

For some people, a printer is an indispensible part of a computer system. For low cost, general-purpose printing, I recommend the NEC P2200 printer. It combines 24-pin quality with a low price. If color printing is a necessity, you should be aware that few impact dot-matrix printers produce good-quality color output. I would save my pennies and purchase a Hewlett-Packard PaintJet or a Xerox 4020. These ink-jet color printers produce dazzling output. *(For more on 24-pin dot-matrix and laser black-and-white printers, see "Lasting Impressions," p. 25, in the July '88 issue. A review of the HP PaintJet appears on p. 18, in the April '88 issue.)*

Modems are another popular perpheral for the Amiga. These devices let your Amiga communicate with other computers over your phone line. Although the Amiga works with any stand-alone modem, my favorite is the Supramodem 2400AM from Supra Corp. Incorporating an interface cable and Amiga telecommunications software into the package, it is a complete telecommunications solution. ►

SPECIALIZED EXPANSION

MANY NEW AMIGA owners buy their machines for a specialized application and therefore require specialized expansion devices and peripherals. While these lie outside the general "Starter Kit" concept, for many people they are of primary interest. If you use your Amiga 2000 for CAD work or desktop publishing, you'll love flickerFixer, a board from MicroWay that eliminates all hi-res flicker. Coming soon for desktop publishers (perhaps by the time this reaches print) is the Viking I, a high-resolution monochrome monitor and graphics system for the Amiga. The Viking I is a joint product of Moniterm and Commodore.

High-quality desktop publishing also requires a laser printer, either a Hewlett-Packard (or HP-compatible) or a PostScript printer. I recommend the QMS PS-810, which can act as either an HP or a PostScript printer. For a complete publishing solution, C Ltd is putting together a desktop-publishing system that includes software, a laser printer, and a scanner. The system promises to be lightning fast.

Scientists and engineers who need to network their Amigas to larger computers should check out the Ethernet interface board for the Amiga 2000 available from Ameristar Technologies. If you require a general interface for the Amiga, ASDG offers the Twin-X General Purpose I/O board, which turns the Amiga 2000 into an IEEE 959 host. If you need more speed and power, you should investigate the accelerator options available from CSA, Ronin Research, and CMI. *(For more on products designed to enhance the scientific/engineering capabilities of the Amiga, see "Workstation Amiga," p. 28, in the August '88 issue.)*

Graphics artists can benefit from a number of top-quality peripherals. Digi-View from NewTek lets you transform a video image into Amiga graphics. It is the video digitizer against which all others are measured. The Easyl from Anakin Research is a drawing pad that simplifies the production of freehand graphics. For the ultimate in graphics input, check out the SpectraScan from ASDG. In conjunction with a Sharp Electronics Color Scanner, the SpectraScan system lets you scan color images at up to 300 dots-per-inch, and use the images in sophisticated graphics and desktop-publishing applications.

Serious electronic musicians will need a MIDI interface and a sound digitizer. Good quality MIDI interfaces are available from Mimetics and Golden Hawk Technology, among others. My favorite sound digitizer is PerfectSound from SunRize Industries, which digitizes stereo inputs.

Video users require a genlock, which overlays Amiga graphics onto a video signal. The best I've seen is the SuperGen from Digital Creations. If you don't need a high-quality genlock, the economical Ami-Gen from Mimetics may fit the bill. The ultimate Amiga video tool, NewTek's Video Toaster, is still in prototype form. It promises to combine a digitizer, genlock, and video-effects generator. □ ***—BR***

A GLOSSARY OF AMIGA HARDWARE TERMS

Auto-Config—An auto-config expansion device is one that is recognized by and incorporated into your Amiga system at startup. Only devices that attach to the expansion bus on the A500 or A1000 or that fit into an expansion slot (not the CPU or the video slot) on the A2000 can be auto-config. Any device that uses the Amiga expansion bus should be auto-config.

Bus—A bus is an information pathway in a computer. The data bus is used to transfer data from one part of a computer to another. The address bus indicates where a particular piece of data is coming or going. An expansion bus normally contains both an address bus and a data bus.

Zorro II—Commodore calls its expansion specification for the Amiga 2000 the Zorro II specification. This describes the electrical signals assigned to the 100 pins in an A2000 expansion slot, the A2000 auto-config circuitry, and the size and shape of an A2000 expansion card. An earlier specification, Zorro I, was developed for Amiga 1000 expansion chassis. With the release of the A2000, Zorro I has been eclipsed by Zorro II.

DMA—Many expansion devices, particularly hard-disk controllers, utilize Direct Memory Access (DMA). A DMA device can access the memory in your Amiga without having to go through the 68000. Thus, a DMA hard-disk system can transfer data from the hard-disk controller to memory without tying up your microprocessor. DMA devices are normally much faster than non-DMA devices.

Expansion Chassis—An expansion chassis is a metal box that contains expansion slots. Many companies produced expansion chassis for the Amiga 1000 to make expansion easier and more uniform. With the advent of the 2000, which contains an expansion chassis on its motherboard, the demand for third-party expansion chassis has waned. A few companies, however, have announced small expansion chassis for the Amiga 500.

Expansion Board—An expansion board is a printed-circuit board that fits into an expansion slot. The connection to the slot is via metal-plated pins that fit snugly into the slot. Amiga 2000 expansion boards have 100 pins that fit into the 100-pin slots on the motherboard. (See also Expansion Cards.)

Motherboard—The large printed-circuit board that contains the chips and wiring that make up your Amiga is called the motherboard. It is the primary component of any computer system. Motherboards are encased in plastic or metal boxes to keep them safe from dust and damage.

Expansion Slot—Expansion slots provide a connection between expansion boards and a computer's address and data buses. Expansion boards fit into slots.

Expansion Card—The term expansion card is nearly synonymous with expansion board. The only difference is that an expansion card does not necessarily have to go into a slot. Some expansion cards, such as the A501 Memory/Clock Card, do not fit into slots but use an alternative type of connector.

Port—Ports allow computers to communicate with peripheral devices such as printers and modems. Ports do not normally provide direct access to the internal data and address buses. Instead, data sent or recieved via a port is processed, or "massaged" by the Amiga 68000 microprocessor or a special peripheral chip.

RAM—The main memory in your computer is called RAM (Random-Access Memory). RAM is used to hold programs while they are running and to store data (pictures, numbers, text, and so on) used by running programs. Programs and data in RAM are immediately available to the 68000 microprocessor that drives your Amiga system. Normally, programs and data are loaded from a disk drive into RAM when they are needed. Data and programs in RAM exist only as long as your computer is turned on. Once you turn off your computer, the contents of RAM are wiped out.

Disk Storage—Also called direct-access storage and on-line storage, disk storage refers to the ability of a computer system to permanently store programs and data on a floppy- or hard-disk drive. Information stored on disk is not immediately available to the computer system; it must first be loaded from disk into memory.

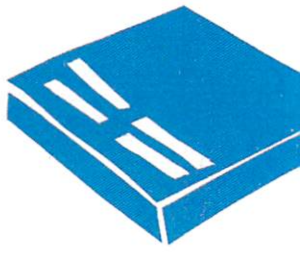
Chip RAM—Amiga memory that is available to both the Amiga 68000 and the custom chips is called chip RAM. Any graphics or sound data must be in chip RAM before it can be output.

Fast RAM—Amiga memory accessible to the 68000 only is called fast RAM. The custom chips never interfere with the performance of fast RAM. All expansion RAM on the Amiga is fast RAM.

Finally, no Amiga system is complete without a joystick. Even the most jaded, number-crunching spreadsheet devotee will be unable to resist the many innovative games available for the Amiga. Like other Commodore computers, the Amiga uses an Atari-style joystick. My favorite is the Winner 770 from Contriver Tech, but you can find many comparable joysticks in any department store selling video-game machines.



Expanding your Amiga need not be a difficult process. As opposed to the early days of Amiga expansion, most current products adhere to Commodore's published expansion specifications and work well with one another. Your biggest problem will be deciding how you want to expand your system and paying off your MasterCard bill. ■



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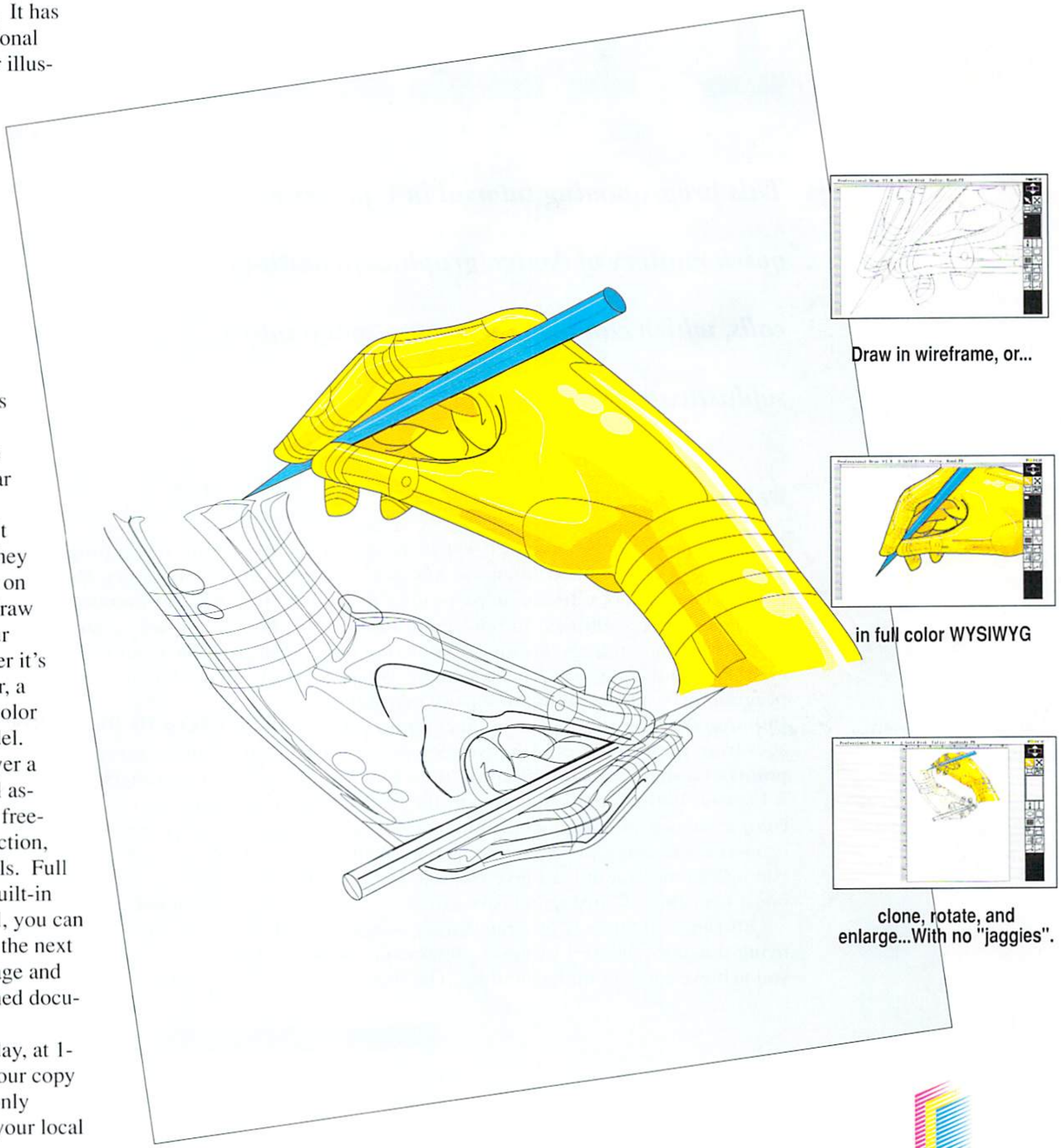
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This entire ad was created and color separated using Professional Draw and Professional Page.

Amiga Primitive

This programming tutorial in C promises a quick mastery of Amiga graphics-primitives calls, which can help turn your Amiga into a sophisticated drawing tool.

By David T. McClellan

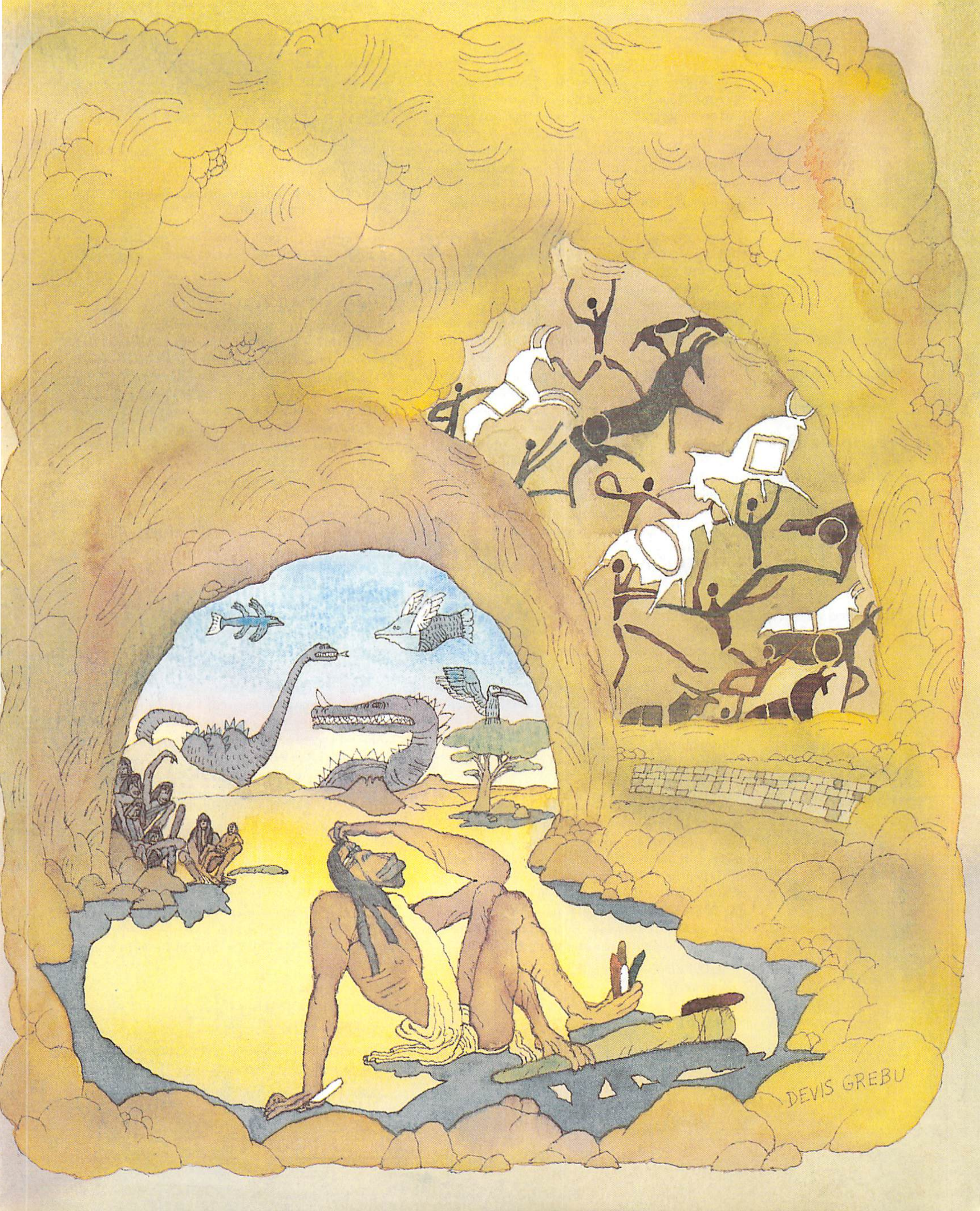
Like the animals drawn almost 20,000 years ago on cave walls in Lascaux and Altamira, Amiga graphics are composed of a few basic parts: dots, lines, rectangles, circles, ellipses, and polygons. Rather than scratching outlines on stone and mixing minerals, clay, and charcoal to make "paint," Amiga programmers simply call upon a paint box full of Intuition drawing routines to build complex images from these graphics primitives. Supply the key points of a shape and Intuition will draw and color it for you. With an understanding of the Amiga's color structure and graphics-primitives calls, you can write a drawing program that may not make you a Cézanne, but at least give you a technological boost over those Cro-Magnon cave artists.

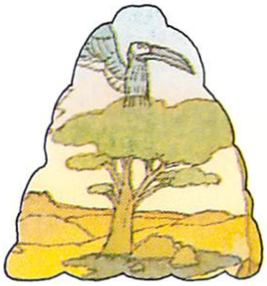
LittleDraw, a Lattice C program listing accompanying this tutorial (see Listings) is designed to help you achieve such an understanding. The techniques this demo program emphasizes are simple and easy to master. Use the mouse to mark the start and end points of lines, filled rectangles, and hollow ellipses; *LittleDraw* does the rest. To demonstrate color handling, *LittleDraw* gives you a choice of eight colors for drawing and filling your shapes.

Resources to Draw Upon

You create pictures by setting bits in special areas of memory (rasters) the computer shares with the display hardware. Think of this memory as a set of geometric planes, with the corresponding bits on each plane combining to define the color of a given pixel. Several planes together are called a bitmap. The number of different colors a particular bitmap can support depends upon the number of bitplanes. To determine the maximum number of colors, use the formula $2^{\text{number of bitplanes}}$. For example, ►

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DEVIS GREBU



While the Amiga can draw rectangles and hollow ellipses easily, filled polygons and ellipses require a bit more work.

a four-plane bitmap allows 16 colors at a time ($2^4 = 16$). The Amiga display hardware examines the bits from the different bitplanes that make up a pixel and uses the resultant bit series as a pointer to a color register. Thus, if pixel (100,50) in a four-plane bitmap is composed of the bits 1101, the color of pixel (100,50) will be the color described in color register 13 (1101 binary = 13 decimal).

Because pixels are organized as sets of raster planes, you can use boolean logic on the planes to achieve several special effects, such as rubberband lines and reverse-video text. The colors, line and fill patterns, and text on the Amiga are all drawn by changing the appropriate bits in a raster.

In the Amiga's multitasking environment, several programs can draw simultaneously in different windows and screens. To keep all the activity sorted out you must tell the ROM Kernel graphics functions in which area of memory to draw. Each window has a RastPort that specifies the screen's resolution, the location of its rasters, and several attributes that affect the appearance of lines and objects you draw, including three pen colors, the line and area pattern, and the current text font.

For any RastPort, you can define up to three colors to be current at once: the Foreground color (FgPen, or APen), the Background color (BgPen, or BPen), and the area outline color (AOlPen, or OPen). The FgPen is the color of a solid line drawn without special effects. The BgPen is the color of the "blank" spaces between FgPen-colored dots in a dotted or broken line. The AOlPen appears only when you lay out a polygon. The surface of the shape is APen, the surrounding screen is BPen, and the outline of the polygon is in OPen. To set APen, BPen, and OPen, use the following three ROM Kernel calls (rp is a pointer to the RastPort attached to the window):

```
SetAPen (rp, color_number);
SetBPen (rp, color_number);
SetOPen (rp, color_number);
```

When drawing lines, the line pattern is a 16-bit mask (a short int in C). In normal drawing mode every 1 bit in the pattern will be a pixel drawn in the FgPen color; 0 bits are pixels either not drawn or drawn in the BgPen color, depending on the drawing mode. The area pattern (made from multiple lines) is a matrix of line patterns with a maximum size of 16 bits wide by any power of two high. You set a line pattern with the statement:

```
SetDrPt (rp, some_16bit_number_giving_bit_
   pattern);
```

For example:

```
SetDrPt (rp, 0xFFFF);
```

yields a solid line, because all pixels are on (are 1s), while

```
SetDrPt (rp, 0x8080);
```

yields a broken line, as every eighth pixel is on.

To set an area pattern, type:

```
SetAfPt (rp, pointer_to_array_of_16bit_
   numbers, power_of_2);
```

Power_of_two is the log base 2 of the size of the array; for an eight-word array, power_of_2 equals three.

Jammed With Color

The ROM Kernel offers four drawing modes: JAM1, JAM2, COMPLEMENT, and INVERSEVID. JAM1 mode is the normal mode—all pixels that correspond to the 1-bits in the line pattern change to the FgPen color as you draw, while pixels that lie in the path of the line but correspond to 0-bits in the mask remain unchanged. In JAM2 mode, those pixels that correspond to 0-bits in the mask become the BgPen color; those corresponding to 1-bits take on the FgPen color as with JAM1. COMPLEMENT mode, an XOR-type mode, uses neither the FgPen nor BgPen color; instead, for each 1-bit in the mask, the displayed color of the pixel is the one's complement of the color register indicated by the pixels in the bitplane. Thus, if you draw over a line with the same pattern, still in COMPLEMENT mode, the pixels revert to their original colors, and the line is erased. I use COMPLEMENT mode in the demo program to draw rubberband lines and boxes. Most useful for text, INVERSEVID works in conjunction with JAM1 or JAM2 and reverses their roles. If you specify (JAM1|INVERSEVID), the text will have transparent letters surrounded by the FgPen color. For text drawn in BgPen surrounded by FgPen, set the drawing mode to (JAM2|INVERSEVID).

To set the current draw mode call:

```
SetDrMd (rp, draw_mode);
```

The constants JAM1, JAM2, COMPLEMENT, and INVERSEVID are defined in the C include file *graphics/rastport.h*.

Going Dotty

The simplest thing you can draw is a single pixel, a dot. If you set color register 3 to green, you draw a green pixel at X = 320, Y = 20 with the following sequence:

```
SetAPen (rp, 3);
SetDrMd (rp, JAM1);
WritePixel (rp, 320, 20);
```

To determine a specific pixel's color, use the ROM Kernel call ReadPixel.

```
color = ReadPixel (rp, 320, 20);
```

►

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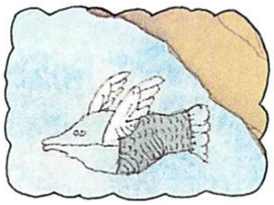
334 South State Street, Ann Arbor, Michigan 48104. (313) 663-8757.

Circle 174 on Reader Service card.

In the above example, ReadPixel returns a value of 3.

While dots are fine for drawing (and ideal for French pointillists), I prefer to use larger primitives. You can draw lines using the current drawing pattern, the drawing mode, and FgPen and BgPen colors. For single lines, start at the current screen position (a point monitored in the RastPort) and end at any point you specify. The end point then becomes the current position. To draw a solid, green line from point A to point B, then to C, type:

```
SetAPen (rp, 3);
SetDrMd (rp, 0xFFFF);   /* all 1s, solid line */
Move (rp, Ax, Ay);
Draw (rp, Bx, By);
Draw (rp, Cx, Cy);
```



By using these graphics-primitive calls, you can render complex drawings through simple programming.

To complete the triangle, draw a dotted line in, say, red (color 14) and chartreuse (color 2) back to point A by typing:

```
SetAPen (rp, 14);
SetBPen (rp, 2);
SetDrMd (rp, JAM2);
SetDrPt (rp, 0xCCCC);   /* alternate 2 red, then 2
   chartreuse */
Draw (rp, Ax, Ay);
```

If you know all the end points in advance, you can collect them in an array and draw the lines at once. Simply make one call to PolyDraw( ), passing the RastPort pointer, a count of the number of points to draw, and the array:

```
PolyDraw (rp, number_of_pts, array_ptr);
```

PolyDraw will draw a connected series of lines, beginning at the first point in the array (PolyDraw uses the Moves( ) call to locate it) and ending at the last point in the array.

Advanced Primitives

If you need to draw with even larger units than lines, the ROM Kernel offers solid rectangles plus hollow and filled ellipses, circles, and polygons. For solid rectangles call:

```
RectFill (rp, xmin, ymin, xmax, ymax);
```

For hollow ellipses and circles type, respectively:

```
DrawEllipse (rp, x_center, y_center, x_radius,
   y_radius);
```

and

```
DrawCircle (rp, x_center, y_center, radius);
```

For a filled area, you first define its outline with a Move-Draw-Draw-Draw-End sequence:

```
AreaMove (rp, x1, y1);
AreaDraw (rp, x2, y2);
AreaDraw (rp, x3, y3);
. . .
AreaEnd (rp);   /* Draw final line back to
     x1,y1   */
  /* and fill with area pattern */
```

To get a filled ellipse or circle, type respectively:

```
AreaEllipse (rp, x_center, y_center, x_radius,
   y_radius);
```

and

```
AreaCircle (rp, x_center, y_center, radius);
```

While the Amiga can draw rectangles and hollow ellipses easily, filled polygons and ellipses require a bit more work. You must set up a storage area for memory to save the list of points that define your polygon. You will need five bytes of storage per vertex of the largest polygon you will draw. In addition, you must allocate a TmpRas struct that points to a raster (a single plane) large enough in rectangular area to hold the biggest polygon or ellipse you plan to draw. You use AllocRaster( ) to allocate the raster planes your pixels reside on. For example, to draw a set of polygons with a maximum individual size of 30 points over a rectangular area up to 160 pixels wide and 90 high, you would allocate the following:

```
WORD *points;
struct AreaInfo af;
struct TmpRas tr;
points = AllocMem (150, MEMF_CHIP);
InitArea (&af, points, 30);
rp->AreaInfo = af;
rp->TmpRas = InitTmpRas (&tr, AllocRaster
   (160,90, RASSIZE (160,90));
```

When your program is done with the TmpRas, insert the statement:

```
FreeRaster (tr->RasPtr, 160, 90);
```

to return the memory blocks to the system. Be sure to do the same for the pixel rasters.

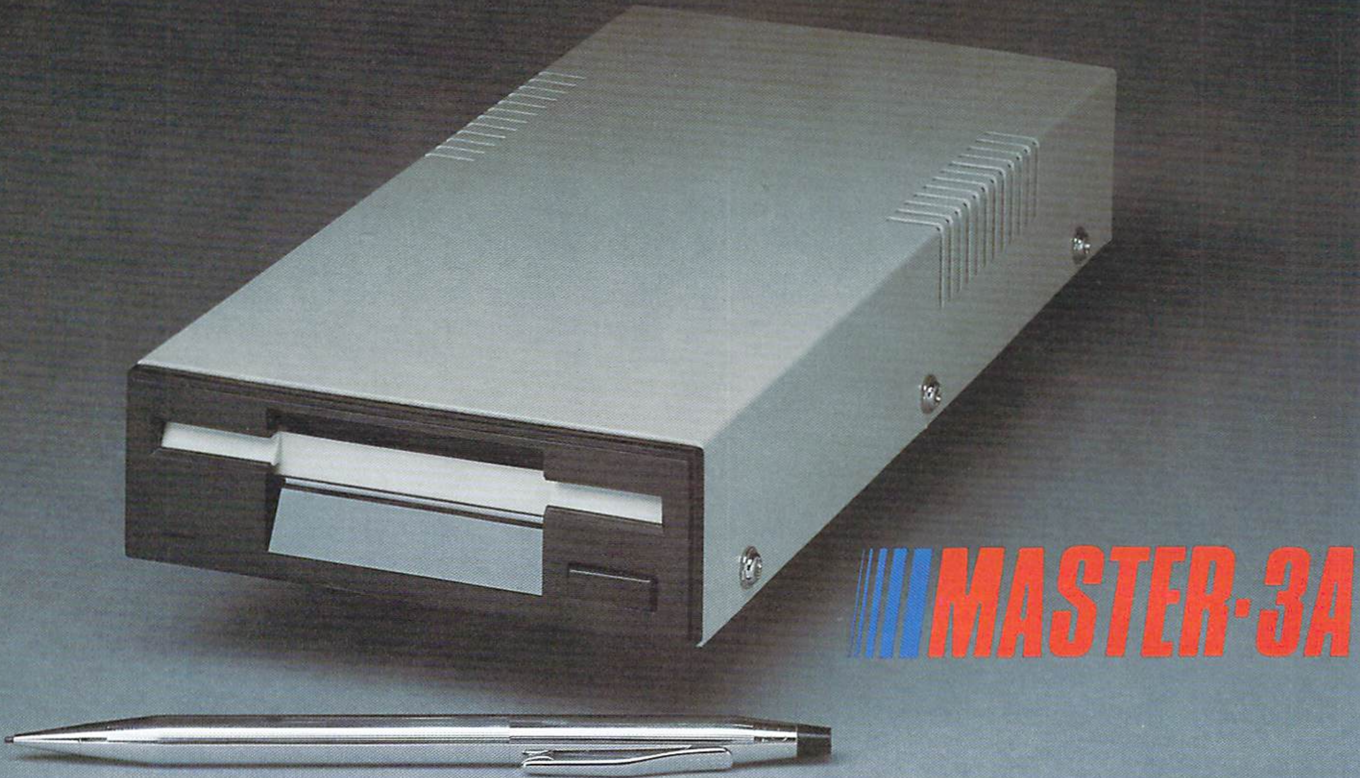
When drawing with areas, rectangles, and particularly with ellipses, make sure none of the points drawn will go outside of your raster. For example, do not specify:

```
DrawEllipse (rp, 300, 180, 50, 50);
```

on a 320 × 200 screen. You will corrupt memory outside of your window and probably crash the system. *LittleDraw* contains some example safeguards.

If you have drawn an outline on the screen and wish to fill it after the fact, you can pass the Flood( ) call a start point and a flood-mode, either Outline or Color mode. Outline mode fills an area ►

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out to an outline of AOlPen-colored pixels. In Color mode, the color of the start-point pixel determines the amount of area filled. The system replaces all like-colored pixels that radiate from the start point with the new color. Call Flood as:

Flood (rp, flood_control, px, py);

where flood_control is either 0 (outline) or 1 (color).

LITTLE DRAW

The demo program, *LittleDraw*, allows you to draw lines, filled rectangles, and hollow ellipses in eight different colors, using a mouse to mark the start and end points. You click on one of the three Drawing gadgets to pick Line, Rectangle, or Ellipse drawing; click on one of the eight Color gadgets for the current FgPen color. The BgPen is always black.

The source code is broken into four files. *Draw.h* sets shared constants and describes the various routines' global variables. *Drimages.c* contains the Gadget and Mouse Pointer images. *Drawset.c* initializes a 620 × 200 custom screen and a borderless window to draw in. *Drawop.c* is where the drawing takes place. *Draw.lnk* is the Blink linking script. While you normally compile Drawset and Drawop with the Lattice lc command, you should compile Drimages with the -ad option (Lattice 4.0) to put the Image arrays in chip RAM.

Drawop is the main control routine. It monitors gadget selections and close-button hits from the user via the window's IDCMP port. (The Setup( ) routine in *Drawset.c* told Intuition which events to watch for.) Color-gadget requests tell Drawop to set the current color. Drawing-object gadgets instruct the program to call a routine associated with the object—DoLine( ) for lines, DoText( ) for text, DoRect( ) for rectangles, and DoElli( ) for ellipses.

DoLine( ), DoRect( ), and DoElli( ) operate similarly. Each waits for the user to push the left mouse button (SELECTDOWN), records the mouse position at that time, and uses Intuition to keep track of the mouse position. At each tick, the program draws a line, rectangle, or ellipse in COMPLEMENT mode from or centered on that initial point to the current mouse position. If a line, rectangle, or ellipse was drawn on the previous tick, *LittleDraw* erases it by overdrawing it in COMPLEMENT mode again. When the user releases the left button (SELECTUP), the program draws a final line, rectangle, or ellipse in JAM1 mode in the current color. The user can cancel a line in progress by clicking the right mouse button without releasing the left mouse button (MENUDOWN, MENUUP). The routine waits for the next left-button click, until the user clicks another gadget (Color or Draw), then it returns to the main program to let it handle the gadget request.

By integrating these graphics-primitives calls into your own programs, you can render complex drawings through simple programming.

David T. McClellan is a contributing editor to AmigaWorld. *Write to him at 104 Chevron Circle, Cary, NC 27511.*

Listing 1. Draw.lnk

```
FROM LIB:c.o+drawset.o+drimages.o+drawop.o
TO LittleDraw
LIB LIB:lc.lib+LIB:amiga.lib
SMALLDATA
MAP LittleDraw.map
```

Listing 2. Draw.h

```
/*-----------------------------------+
|   LittleDraw.h                     |
|   LittleDraw Definitions, Globals  |
+-----------------------------------*/
/* Window/Screen/BitMap Sizes */
#define DEPTH  3
#define WIDTH  640
#define HEIGHT 200
/* Colors - fixed set for now */
#define BLACK   0
#define WHITE   1
#define RED     2
#define GREEN   3
#define BLUE    4
#defineYELLOW 5
#define MAGENTA 6
#define CYAN    7
/* States (user-driven) */
#define S_Nothing 1 /* Waiting for user choice */
#define S_WaLine  10 /* Wait for line begin pt */
#define S_1stLine 11 /* About to draw 1st line */
#define S_DrLine 12 /* Drawing line-selectup ends */
#define S_WaRect  20 /* Wait for rect. begin pt */
#define S_1stRect 21 /* About to draw 1st rect */
#define S_DrRect 22 /* Drawing rect-selectup ends */
#define S_WaElli  30 /* Wait for ellipse center */
#define S_1stElli 31 /* About to draw 1st ellipse */
#define S_DrElli 32 /* Draw ellipse-selectup ends */
/* Gadget Image sizes, placement */
#define GAD_HEIGHT12 /* Height of mode gadgets */
#define GAD_WIDTH16 /* Width of mode gadgets */
#define GAD_TOPOFF10 /* Start of top gadget */
/* Cross-Hair Pointer size, placement */
#define CROSSWIDTH9
#define CROSSHEIGHT 9
#define CROSSXOFF -4
#define CROSSYOFF -4
/* Variable Declarations */
extern struct Window *win;
extern struct Screen *scr;
extern struct RastPort *rp;
extern long MyIDCMP_Flags; /* For ModifyIDCMP */
/* Image data from drimage.c */
extern USHORT Line_Pict[], Rect_Pict[], Elli_Pict[],
Black_Pict[], CrossHair_Pict[];
/* Gadget ID's */
#define GID_LINE 1
#define GID_RECT 2
#define GID_ELLI 3
#define GID_BLACK 5
#define GID_WHITE 6
#define GID_RED 7
```

Listing continued on p. 112


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MOUNT UP!



Like Sergeant Preston and Yukon King, Team info.phile joins the "Mounties" this month to uncover the mysterious Mountlist file—key to adding hard disks and other devices to your system.

By Mark L. Van Name and Bill Catchings

WHEN ADDING CERTAIN devices to your system, you may encounter a little-known file, Mountlist, that may prove perplexing to the uninitiated. This is particularly likely now that many Amiga users are finding they need hard disks for their systems. Knowing how Mountlist works can make it easier to install everything from a hard disk to AmigaDOS 1.3's recoverable RAM disk.

Finding Mountlist is easy enough (it's in the devs directory of your Workbench disk), but understanding it can be a bit more difficult. Let's start with some background on how the Amiga recognizes add-on devices and the role that Mountlist plays in this process.

Most Amiga add-on devices follow the Amiga auto-config standard, which allows your system to recognize such de- ►

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ONE MISTAKE AND IT'S THE BIG PANCAKE.

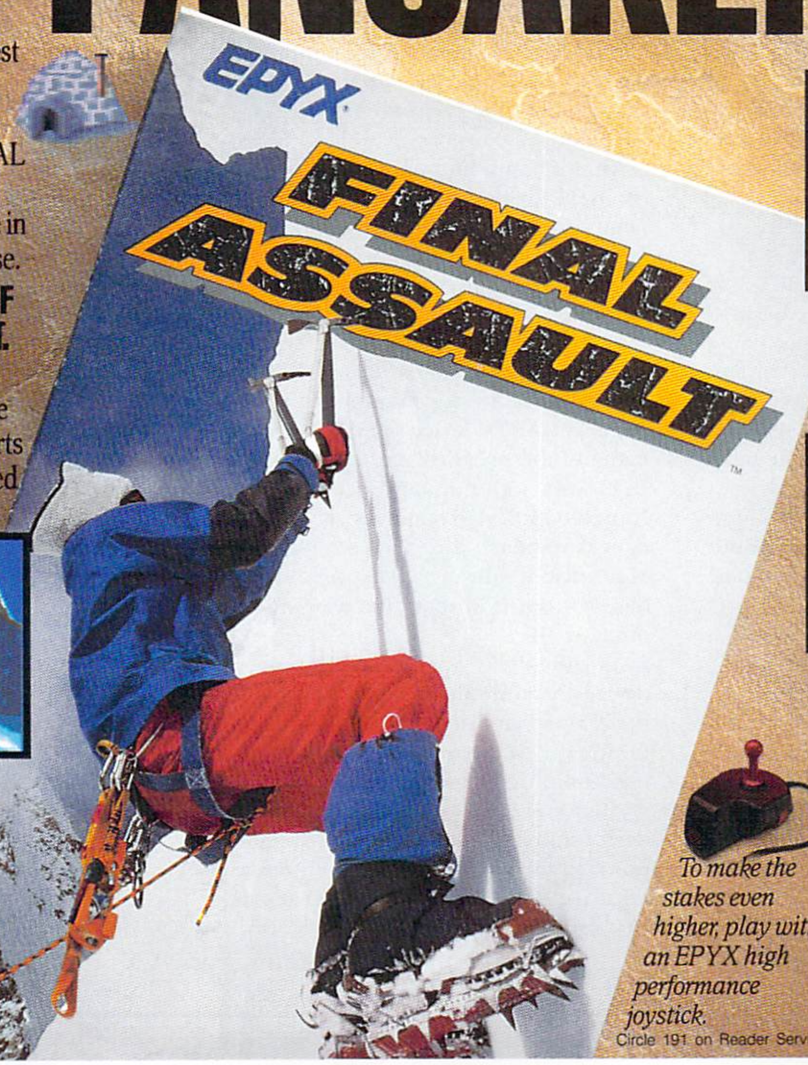


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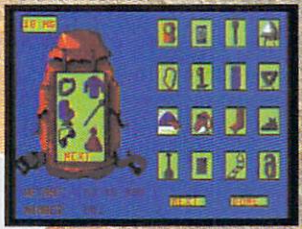
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vices and load the software that manages them (their drivers or handlers). There is very little you need to do to accomplish this, except to remember to leave the BINDDRIVERS command in your s/startup-sequence file. When your Amiga boots, BINDDRIVERS tells it to load the handlers for almost all of your add-on devices.

While the BINDDRIVERS method of installing devices is easy, it does not work in all cases. To make the Amiga recognize some devices you must tell it to do so with the MOUNT command.

For example, AmigaDOS lets you treat a hard disk as either a single device or as a collection of several smaller devices. Each section of a hard disk you plan to treat as a separate device is known as a partition. While the BINDDRIVERS command lets your Amiga know about the first partition of a hard disk, it does not recognize any other partitions. To use them, you must MOUNT them. The same is true of the new recoverable RAM disk: to use it you must first MOUNT it.

This is where the Mountlist file comes into the picture. The MOUNT command's format is:

MOUNT <dev>:

where <dev>: is the name with which you will refer to the device that you are mounting. MOUNT knows how to set up <dev>: from an entry with the same name (<dev>:) in the Mountlist file.

MOUNTLIST ENTRIES

These entries can describe three basic things: devices, such as hard disks; handlers, such as the AUX: handler that lets you use another terminal with your Amiga; and file systems, such as the AmigaDOS 1.3 FastFileSystem. The basic format of all entries is the same, although their contents vary with the type of thing they describe. Because most of us run into devices far more often than handlers or new file systems, in this column we look only at Mountlist device entries.

Although many Amiga software suppliers include a sample Mountlist entry for their disks, it's useful to know how to change that entry so that you can, for example, create more partitions, or change the size of the default ones.

To understand the format of Mountlist entries, let's start with an example: the AmigaDOS 1.3 (Gamma release) default entry for RAD:, the recoverable RAM disk (see last month's "info.phile" column, p. 94, for a discussion of RAD:):

```
/* This is an example of a mountlist
entry for using the recoverable ram disk.
Depending on the amount of memory
you wish to devote to it, you may want to
change the HighCyl value.
 */

RAD:   Device = ramdrive.device
       Unit = 0
       Flags = 0
       Surfaces = 2
       BlocksPerTrack = 11
       Reserved = 2
       Interleave = 0
       LowCyl = 0 ; HighCyl = 21
       Buffers = 5
       BufMemType = 1
       #
```

The first several lines of the entry comprise a comment that describes it. You can put as many comments and blank lines in Mountlist as you want. To mark text as a comment, enclose it between /* and */. (These are the comment characters of the C programming language.)

After a blank line we get into the entry itself. Every device entry uses the same format for its first line. (The indentation is optional, but it helps make the entries more readable.) That format is:

<dev>:Device = <device handler>

<dev>:, as we said earlier, is the name of the device. In our example above, the name is RAD. <device handler> is the name of the program that lets AmigaDOS work with that device. The standard AmigaDOS device handlers are in the devs Workbench directory, along with the Mountlist. If you install a special device handler, put it in that directory with the others.

As you might expect, different types of devices need different handlers. You run RAD: with ramdrive.device, while most floppy drives use trackdisk.device and most hard disks take hddisk.device.

After you have given the name of the device and its handler, it's time to get down to the meat of the device's description. You state each necessary characteristic of a device in the same basic way, using lines of the following form:

<keyword> = <characteristic>

After you finish giving all of a device's characteristics, you must end the Mountlist entry with the following line:

#

You can include more than one keyword/characteristic pair in a line, as the RAD: example does with LowCyl and HighCyl, but you must separate them with a semicolon (;).

Exactly which characteristics you must state for a device depends on the device's type. If you omit a keyword, you'll get the system default, which is usually acceptable.

A CHARACTER PROFILE OF RAD:

Taking our RAD: example above as a typical disk-drive entry, let's examine these characteristics in detail by going through the RAD: entry line by line.

Unit is a number that AmigaDOS uses to help identify the type of your device. RAD: is always unit 0. Hard disks built according to the ST-506 standard use unit 1. The other type of Amiga hard disks, SCSI disks, generally are unit 3. Floppy drives are usually unit 2.

The Flags keyword supplies options to the AmigaDOS function that prepares the device for your use. Unless your device manufacturer tells you to do otherwise, leave it at the default value of 0. There are other Flags options, of course. For example, if you decided to format RAD: as a FastFileSystem device, then you would not be able to boot from it. To let AmigaDOS know that it was not a bootable device, you would change its Flags to 2.

Five keywords—Surfaces, BlocksPerTrack, LowCyl, HighCyl, and Interleave—describe physical characteristics of the disk.

Surfaces refers to the number of physical surfaces in the disk. A disk drive is like a stack of one or more platters, or LPs, with space between them for heads, which are like stereo needles, to read them. Drives typically can use both sides of each platter. Thus, a value of 2 following Surfaces means a single platter in the drive.

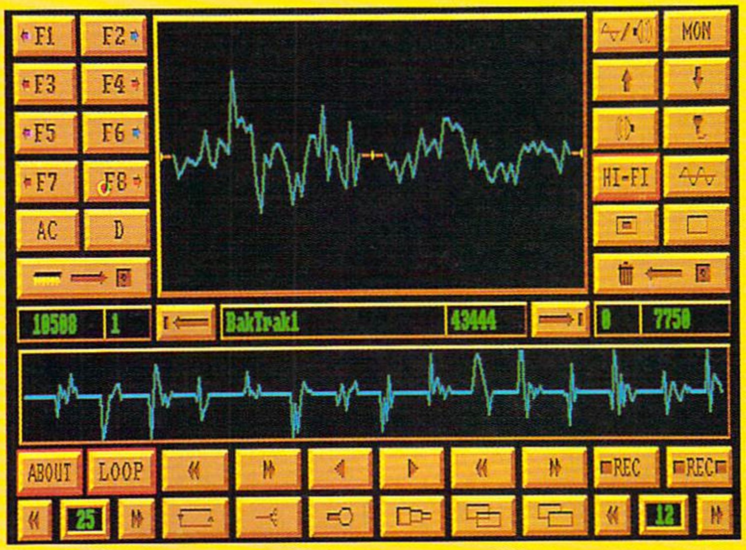
Each side of a disk's platter is divided ►

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into a series of concentric rings called tracks, much like songs on an LP. Each track, however, is further subdivided into a number of even-sized blocks. The Amiga uses 512-byte blocks. The BlocksPerTrack keyword tells how many of these blocks fit in each of your disk's tracks.

Your disk drive dealer should supply you with the Surfaces and BlocksPerTrack information for your drive. In the RAD: example above, AmigaDOS 1.3 insists that you leave Surfaces and BlocksPerTrack as we show them there—the reason being that RAD: is designed to emulate a hard disk with two Surfaces and eleven BlocksPerTrack.

Every platter of a disk has the same number of tracks. A set of corresponding tracks on all of a disk's platters, such as all of the first tracks or all of the second tracks, is known as a "cylinder." LowCyl and HighCyl let you fix the number of your drive's cylinders you want to use in this device. By using less than all of them, you get a device partition that is smaller than the whole disk. As with so many other bits of computerese, drive manufacturers number their cylinders starting at 0. Remembering this numbering scheme, we can see that by default RAD: uses 22 cylinders. While physical hard disks have a fixed highest cylinder, RAD: is limited only by the amount of memory in your system. If you want RAD: to be larger, make its HighCyl larger. LowCyl and HighCyl let you control the size of a disk partition, but they do not tell you that size in bytes. To calculate a partition's size in bytes, compute the following:

Surfaces × BlocksPerTrack × 512 × (number of cylinders)

(We use 512 in this equation because it is the standard Amiga block size in bytes.) So, RAD: by default contains 247,808 bytes (2 × 11 × 512 × 22). If you would prefer to use the more traditional computer unit K (one kilobyte = 1024 bytes), simply substitute 0.5 for 512 in the equation. RAD:'s default size is then 242K.

Interleave, the final physical keyword, relates to the speed at which the combination of your disk drive and disk-drive controller can supply information to AmigaDOS. When Interleave is 0, AmigaDOS knows that your drive and controller move data quickly enough that it is safe to store logically sequential blocks of a file on physically sequential blocks of a disk. If Interleave is larger, say 2, then AmigaDOS knows to leave at least two physical blocks on the disk between every two logically sequential blocks of each file. The lower the Interleave, the better.

Again, your disk drive dealer should supply you with the right value for Interleave. If not, use 0 because most Amiga drive controller/drive pairs can run at that speed.

The Reserved keyword is the number of blocks that AmigaDOS needs for its boot block, the place where it stores the information it needs to be able to boot from that drive. Reserved is almost always set at 2.

The remaining two keywords in our RAD: example, Buffers and BufMemType, affect the way AmigaDOS manages its interaction with that device. To make your system run faster, AmigaDOS keeps in memory a few "buffers," which are copies of the disk blocks that you read or wrote most recently. In general, the more buffers you give AmigaDOS for your disk, the faster your disk will seem to perform. Each buffer, however, consumes 512 bytes of your RAM. You must be sure that you have enough spare memory to support all of your disk buffers and all of your applications. It's a good idea never to give a device fewer than the default five buffers, and it's preferable to use more if you can spare the memory. If you want to leave your Mountlist entry with only a few buffers, but then add some later when you want to speed your disk accesses, you can use the ADDBUFFERS command to do so.

BufMemType tells AmigaDOS the kind of memory it can use for its buffers for this device. The Amiga's special graphics and audio chips can work only with special memory known as chip memory. The rest of an Amiga's memory is called fast memory. By setting BufMemType you tell AmigaDOS whether it can choose which memory it will use (set BufMemType to 0 or 1), force it to use chip memory (2 or 3), or force it to use fast memory (4 or 5). Unless you have a special need to free up chip memory for some application, leave BufMemType at its default value of 0.

One More Time

As a fast and final review, let's quickly go through one more Mountlist entry, this time a sample from the standard AmigaDOS 1.2 Mountlist for a hard-disk partition:

```
/*Sample Mountlist Entry to add another partition to an ST-506 drive
 */
P2:   Device = hddisk.device
      Unit = 1
      Flags = 0
      Surfaces = 4
      BlocksPerTrack = 17
      Reserved = 2
      Interleave = 0
      LowCyl = 300 ; HighCyl = 601
      Buffers = 20
      BufMemType = 0
      #
```

As you can see, it uses the same keywords as the RAD: entry, although most have different values. The device handler is hddisk.device because it is an entry for a hard disk, and the Unit is 1 because it is an ST-506 hard disk.

This entry describes a second partition of a hard disk. Because it uses a LowCyl value of 300, we can guess that cylinders 0 through 299 went to the first partition. This second partition will contain 10,268K (4 × 17 × 0.5 × 302), or about 10MB.

This hard-disk partition will also use more AmigaDOS disk buffers than RAD: (20 vs. 5). That's probably a good idea, since a hard disk, even a fast one, is necessarily slower than a RAM disk.

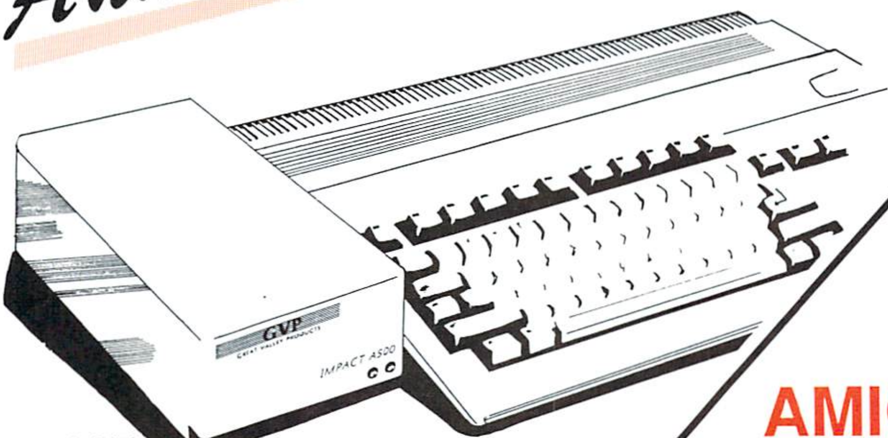
These two examples should be enough to get you started on Mountlist. We did not have room in this column to cover every possible Mountlist device-entry keyword, much less the other kinds of Mountlist entries. With this information, however, you can take the sample entries in your Mountlist file and change them to accommodate your own hard disks or recoverable RAM: disk. Be patient and allow time for experimenting, and you will find that the Mountlist is another powerful and useful AmigaDOS feature. ■

Mark L. Van Name and Bill Catchings are contributing editors to AmigaWorld. *Write to them at 10024 Sycamore Rd., Durham, NC 27703.*

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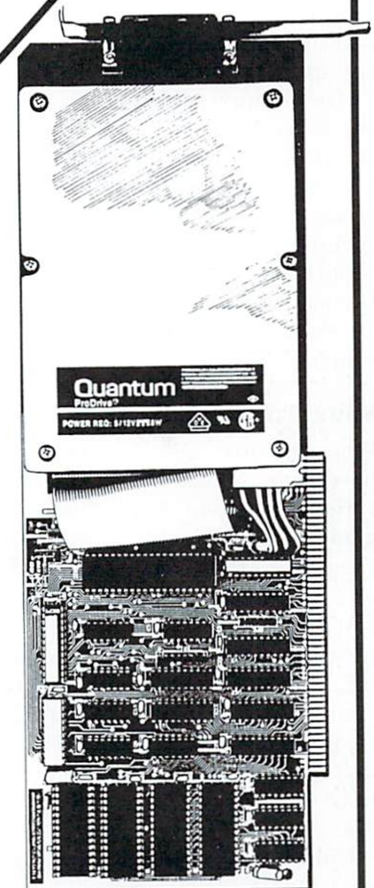


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from p. 22

you require it to remain on screen longer than the rest. Otherwise, Flipper automatically assumes that the pages are to be flipped as fast as possible.

If you decide to remove a picture from your sequence, select its file name with the mouse and use the Delete function to discard it. If you delete a file accidentally, simply select the file name that the deleted picture should follow and use the Add function again.

The compressed images that Pack produces can be played back at speeds ranging from 4 to 60 fps (frames per second). Use the player program Display included in the package. Flipper also allows easy identification of files compiled in the HASH format by adding an extension to the name (.PAC32L, for example), which reminds you of the method of storage, number of colors, and resolution used.

Some Caveats

While the program is easy to use, it does have some problems. The first few times I tried to compile an animation, the program gave me Trouble-Saving errors. Even after examining my disk, reformatting it, and verifying that I could read and write to it with no problems, the program sometimes still had trouble saving. The problem persisted, on occasion, even after I tried several different Amiga computers, disks, and disk drives. In addition, the software completely crashed twice when I was choosing pictures to flip.

Unlike other page-flipping programs available, Flipper takes the IFF pictures and compresses them into the ANIM or HASH format for display. While a good idea for 3-D programs, it does not work well for page-flipping programs. After compiling in both HASH and ANIM formats, I compared the times it took Animation:Flipper and Mindware International's Page Flipper to display 16 low-resolution black-and-white pictures. Both programs employ double-buffering techniques to smooth the display process, but the Mindware program performed almost twice as fast as Flipper. I employed the same test using other resolutions, with the same results.

The manual is well written and easy to understand. It includes a number of hints for using Digi-View 2.0 (NewTek). The software, however, needs a revision to fix its bugs.

Animation: Flipper
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One megabyte and two disk drives required.

Animation: Apprentice 3.0

Get your skeletons dancing.

By Wayland Strickland

WITH ANIMATION: APPRENTICE 3.0 you can produce 3-D character-type animation, a complex task considering how the body's motions are interconnected. To touch your head with your hand, for example, your wrist, elbow, and shoulder must all move for your hand to arrive at its destination. As difficult as animating such motions sounds, Animation: Apprentice makes the task relatively easy by employing seven specialized programs: Sculpt, Character, Action, Director, Rehearsal, Record, and Display.

All In Your Head

You use Sculpt to make and edit three-dimensional objects. In a separate paint program, draw two views of the object you wish to create. For a human head, for example, you would create a front view (a visage) and a side view (a profile). Import them into Sculpt and use the Autosculpt feature to combine the visage and profile into a three-dimensional version of the object. Autosculpt vertically slices the object into sections, which you can resize to change the object's appearance. Add surface detail from Sculpt's touch-up menu. You could, for example, use texture mapping to apply a digitized face to the sample head.

After the basic objects are complete, you must assemble them into a body, with the Character program. You tell the program which "bones" will take priority over others and where they will be placed, and Character creates the skeleton. For example, when the shoulders move, the body below the shoulders is affected. The shoulder bone is called a patriarch. Bones that are moved as a result of the patriarch are called progeny. A parent bone is a single bone such as a forearm that causes the movements of attached bones to move as well (the wrist, hand, and fingers). Siblings are bones that will follow the parents, but do not follow each other, such as your left and right arm.

You move the skeleton with the Action program. Action displays your newly created skeleton as a stick figure. To record movements for any of the bones, select the bone to be moved and the type of movement (swivel, roll, tilt, etc.) with the mouse. You can view the stick figure from the top, bottom, front, back, left, and right. Action uses an Ease feature to smooth out movements, making them appear more realistic. When you lift an object off of a table, for example, your arm starts moving slowly, then gains speed rapidly, and slows down quickly upon reaching its destination. Ease simulates that phenomenon by letting you specify the number of frames needed for the movement. Once a basic move is complete, you can view the movement with the Audition feature. Playback speeds range from 4 to 60 frames per second (fps).

Besides controlling the camera's viewpoint and perspective and direction of the light source, the Director program creates choreography (motion) files for the camera and characters. Choreography files are divided into key frames that select the direction the character is facing, the size of the character, and the specific location of the character. The characters are represented on the screen by circles with arrows in them, denoting the direction that the character is facing. The stage on which the character stands is represented by two diagonal lines reaching outward and upward across the screen. The Perspective feature lets you view any single frame in the choreography and tells you the camera position, light source, character size and position, and viewplane for the frame.

The camera, like the characters, can have very complicated movements such as panning left to right, tilting up or down, dollying foward or back, and trucking left to right. The camera can also be boomed up or down, and while it cannot move behind the stage, you can move the stage to get those special views. ►



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Circle 179 on Reader Service card.

The viewplane acts like the focal length of a lens. If you use a value that is too small, you can achieve strange effects.

In the Spotlight

The light source is a fixed distance from the stage and can only be moved in an arc. This method is not as limiting as it sounds and works well. Director permits intensity adjustments of both ambient light and the single light source. Unless you use a background picture, Director automatically will perform the animation on a black (color 0) background for use with genlocks.

Rehearsal uses the choreography created by Director to generate the finished animation in a wire-frame mode. Because the animation is represented without any detail, Rehearsal speeds up computing time required to compile the animation. You can play the compiled animation at speeds from 4 to 60 fps.

Record lets you save your animation. First you must specify the animation's resolution, either lo-res in 2, 4, 8, 16, 32, or 4096 colors or hi-res in 16 colors. You must also indicate whether you want the characters shaded in reference to the light source or to be drawn with a black line around them as in traditional animation. You can save your animation to disk in two forms, Pack and IFF. Pack uses an anim-type format to save compressed animation images to disk. The packed images can only be played with the supplied Display program. IFF uses the standard IFF picture format so you can display the frames with a page-flipping or paint program. The View option does not save the frames to disk, but displays them as it generates each one. While you can see each frame, you lose the flow of animation. One frame might be rendered quickly, but the following image might require a half hour to display.

Aside from the slow rendering speed, common to such memory- and calculation-intensive applications, the only problems were those of omission. In Overscan mode, images do not fill the complete screen. Nor can the program generate animations in Interlaced mode. Fortunately, these were the only problems that I could find.

Animation: Apprentice suits the Amiga well. The software multitasks and makes good use of icons and pull-down menus. In addition, the manual for version 3.0 is very well written, offering suggestions and clear explanations. Easy-to-understand instructions coupled with complex animation is a winning combination that I recommend.

Animation: Apprentice 3.0
Hash Enterprises
2800 East Evergreen
Vancouver, WA 98661
206/693-7443
$299.95
One megabyte required.

Intellitype
Mavis Beacon Teaches Typing

The touch of ten is better than the peck of one.

By Neil Randall

IF SITTING at the keyboard sends you into slow motion, you are a candidate for a refresher or starter course from Intellitype or Mavis Beacon Teaches Typing. Besides teaching text input, both programs offer a host of charts and graphs to track your progress. Both use the metaphor of the typing classroom, and both emphasize individualized progress. From there, their styles diverge.

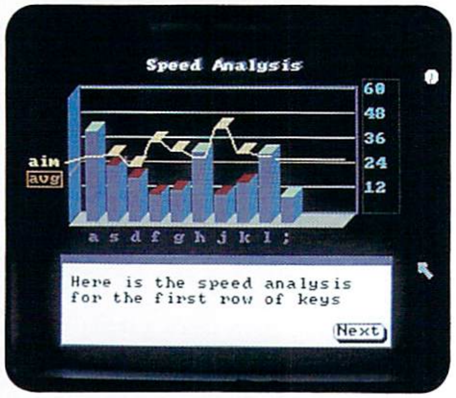
Intellitype

Intellitype comes on an unprotected disk, although the manual states that the program is not configured to run on a hard drive. Each student needs a separate data disk. When Intellitype boots, it reads your progress, setting you at the appropriate lesson. As a new student, you type a diagnostic test that the program analyzes to determine your starting level.

Targeted for adults, the program contains 30 lessons, each designed to take 45 minutes and consisting of warm-up exercises, practice drills, letter-number combinations, and a lengthy typing exercise. In the first 15 lessons, you work with letters, numbers, punctuation marks, and symbols. The next nine lessons emphasize coordination to correct common problems such as transposing, alternating, and doubling letters. Lessons 25–29 build your speed. The last lesson is the graduation exam.

In the lessons, you copy what the computer prints on the screen; the character you type is displayed below the computer's. If you make a mistake, a wedge appears above the error; you can backspace and correct it, but the statistics will be more useful if you don't. The typing exercises also present a series of stories for you to read while typing them. Rather than entertain, the story inhibits speed because typists should concentrate on keystrokes, not words.

You do not have to take a lesson each time you boot Intellitype. You can select one of 10 drills, concentrating on triplets



Your strengths and weaknesses—in full color.

(kik, juj, and so on), trigraphs (common 3-letter combinations), alternating hand usage, capitals, alternators (words with repeating letters and letter pairs), common transposing problems, and speed typing. In the TypeRope game, you move a tightrope walker across a rope by hitting the correct keys.

Intellitype's strongest point is analysis. After you finish the exercises or a lesson's final test, the program analyzes your performance in three areas. Accuracy represents the percentage of correct keystrokes. Speed measures words per minute (penalizing for errors). Advanced errors (doubling, capitalization, transpositions, omitting letters, adding extra letters, dyslexic errors, and so on) displays a series of possible problem areas. Each performance monitor offers four separate charts, one for each row on the keyboard, and compares your results with the goals for the lesson. The program ►

also offers speed and accuracy details about your performance on any key.

While Intellitype is relatively easy to use and extremely valuable for analyzing problems, some aspects are ill-considered. The diagnostic test is far too long. To find your beginning lesson level, you must copy six screens of words—a lot for a person who doesn't know how to type. Because I wanted to start with the first lesson, I randomly pressed keys, trying to fool the program into thinking I was a complete novice. It told me the analysis was impossible because of too many errors. When I continued, the program crashed. Such an intelligent program should offer an easier, shorter diagnostic test, or simply allow you to bypass the test and start where you choose.

If you begin a drill, you cannot abandon it until you complete at least half. I understand why you should commit yourself to a lesson, but the program should let you flip from drill to drill as a preview. A related problem is that the program forces you to complete the warm-up and key exercises before beginning each lesson.

Intellitype is extremely worthwhile for a dedicated student, but it does not recognize that some people like to learn in a less rigorous manner. Until the start-up problems are solved, I can't recommend Intellitype to beginners who do not have considerable stamina.

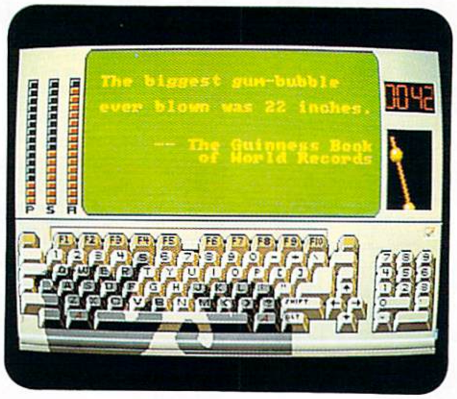
Mavis Beacon Teaches Typing

Mavis Beacon Teaches Typing sets the standard for typing tutors. As a new student, you enter your name, select your age group, and estimate your skill level (novice, hunt-and-peck, or touch typist). Then it's off to the Classroom, where Mavis explains the lesson plan. You can agree with the suggested plan or click Let's Do Something Else. Something else includes seeing another suggestion, repeating the last lesson, changing text format, and so on. Because Mavis' suggestions are tailored to the individual, however, agreeing with the suggestion is best.

During the lesson, the program displays words or letter combinations at the top of the screen and a keyboard and ghostly hands at the bottom. As you type, so do the hands. The idea is to keep your eyes off the keyboard and on the screen. To reinforce the lesson, Mavis suggests a Workshop session. The Workshop's screen is similar to the Classroom's, but contains a metronome (to encourage rhythmic typing), meters (to monitor your accuracy, speed, and progress), and a clock (to keep track of your time). After the lesson, 19 graphs help you analyze your progress.

For a change of pace, Mavis takes you to a typing arcade. Sitting in your race car, you see your opponent in the rear view mirror. When you type a letter correctly, you pull ahead of your opponent. Type quickly *and* accurately and you leave your opponent in the dust. Entering characters incorrectly allows the other car to get closer. Stop typing and the car overtakes you.

The program is easy to customize. You can alter or turn off the metronome, meters, and clock, or do away with the typing cursor, guide hands, and the on-screen keyboard's labels. The race car's speed can be adjusted to match your word-per-minute rating, and you can specify whether or not Mavis will force you to correct errors. You can determine the degree to which Mavis considers past lessons and the frustration level when preparing lessons, and opt for terse or verbose commentaries. If you wish, you can ask Mavis to teach you about the Dvorak keyboard.



A ghost is following you!

Mavis understands children, too. Their lessons are shorter, and placing them in the appropriate age group makes a difference. To lower the frustration level, the program lets you quit whenever you want, an especially useful feature for restless children. Choosing Quit saves the typist's data to disk; the next lesson is based on that data.

Mavis is not without her faults. If your fingers are not on the home row and you hit a series of wrong keys, Mavis counts them all as errors instead of stopping you. (Mavis does interpret random keystrokes as frustration, though, and plans your lessons accordingly.) In addition, the disk is copy protected and offers no provision for saving data to a separate disk. Backups cost $5.

Margin Notes

I prefer Mavis Beacon over Intellitype. Both will increase your typing speed and accuracy, but through different methods. Mavis Beacon tailors its lessons more accurately and avoids Intellitype's "eat-your-spinach" brand of adult learning. If you have children or like a loosely-structured lesson plan, choose Mavis. If you benefit from a more rigid learning atmosphere, choose Intellitype.

Intellitype
Intellisoft Systems
Distributed by Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
415/571-7171
$49.95
No special requirements.

Mavis Beacon Teaches Typing
The Software Toolworks
Distributed by Electronic Arts
$44.95
No special requirements.

Photon Video Transport Controller

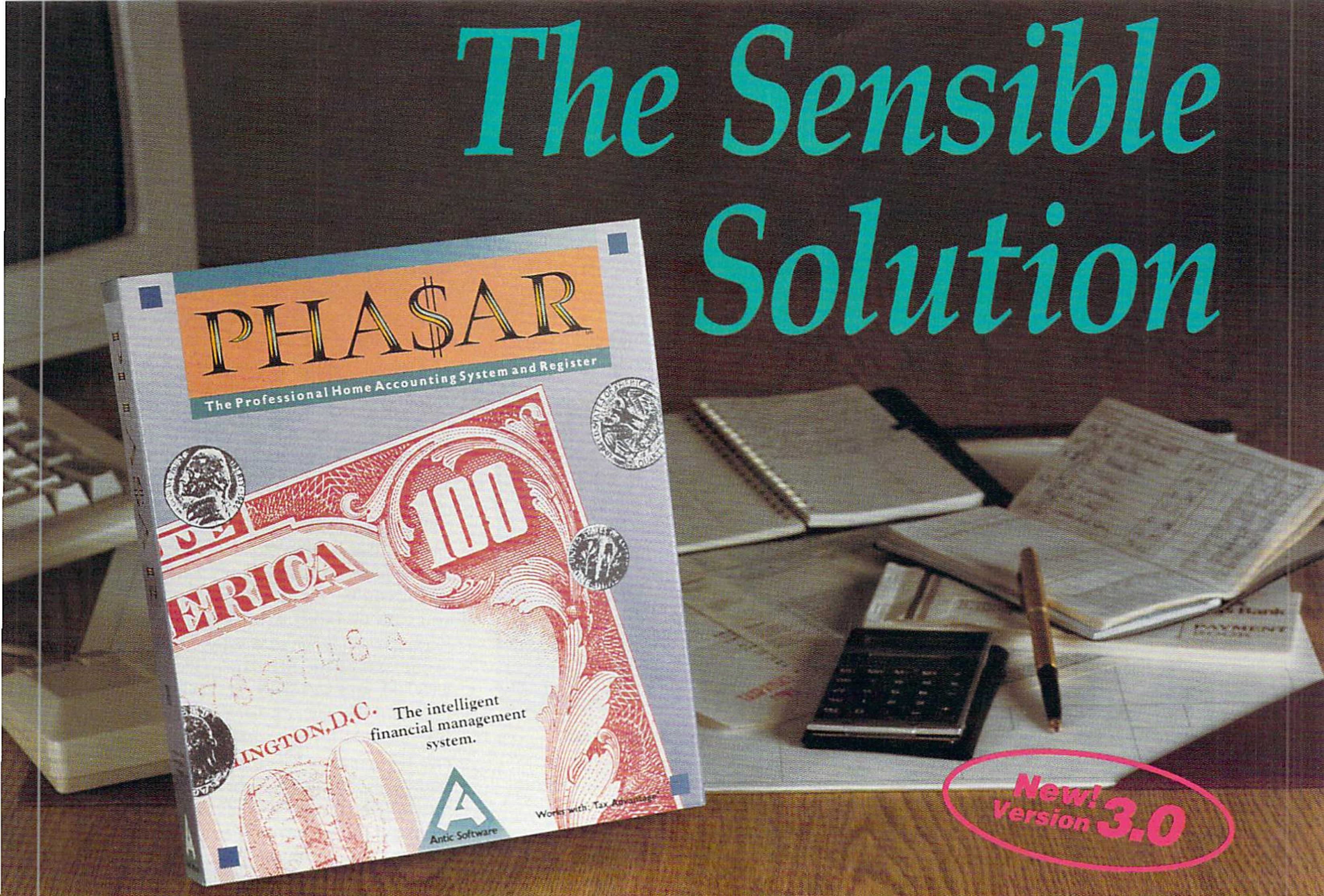
Transfer your ideas from the drawing board to videotape.

By Wayland Strickland

PHOTON VIDEO TRANSPORT Controller is designed to multitask with scene-rendering animation software while driving a single-frame animation controller and videotape recorder (VTR) simultaneously.

The Transport Controller is furnished, along with two utilities, on a single disk. The program's design lets you update it and install additional modules easily. Before you begin animating, you must run the Install-TC module: Simply click the ►

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MM8AW-4

icon and select your animation controller from the menu. Your selection determines the file that the program copies to the LIBS directory of your Workbench or hard disk.

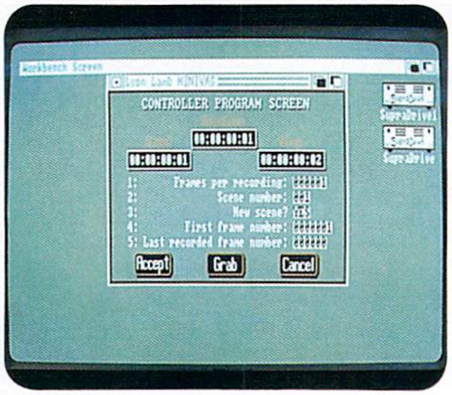
The Star

At present, Transport Controller operates five animation controllers: Lyon Lamb's MINIVAS and VAS IV, BCD's Model 2500, Pico Systems' Animation Controller, and VideoMedia's V-Lan. An animation controller accepts commands from the computer via a RS-232 cable and attaches to the VTR using a 9-pin or 50-pin controller cable.

When Transport Controller is activated, the program displays a window in the center of the screen that lists the VTRs your controller can communicate with. The program displays the controller's status and the last VTR used in the lower part of the window, provided your controller has non-volatile memory.

Once you select a VTR, the program screen appears. Three small windows display selections of the time/frame counter (hours:minutes:seconds:frames) and instruct the controller where to begin editing on the tape (start point), duration of the segment, and the end point. Once you select the start point and duration, Transport Controller calculates and sets the end point. This window also simultaneously displays frames per recording (if the duration is four seconds, the number of frames would be 120), first and last frames recorded in the current session, scene number (used to partition the tape into sections), and new scene (used to determine whether a new tape needs to be striped).

The Project Menu permits you to load, save, and reset the program screen parameters. The Prepare menu lets you toggle the interlace option and select standard Workbench colors or any special settings.



Transport Controller: the missing link.

Before you can record an animation, you must stripe the tape you will use. Striping is the process whereby you record video (usually blackburst) from a sync generator, camera, or computer onto the videotape. During or following the striping process, you must also record time code onto the tape (the method for recording time code depends on the controller). The last two selections in the Prepare menu aid in striping the tape. The first, Pre-Black, records new video (an assemble edit that erases existing video or audio) onto the tape. Pre-Stripe functions similarly, and preserves the existing control track (an insert edit that preserves the control track while replacing the video or either of the audio tracks). For your convenience, Transport Controller displays a black screen when either Pre-Black or Pre-Stripe is selected. This screen can then be used in place of a camera or sync generator, thus providing sync to the VTR.

The Walk-ons

The TC-PageFlip utility acts much like an animator's display stand. For example, if you have a sequence of cells that you wish to animate, the program will load this sequence and assign a number to the end of the file name (TEST01, TEST02, and so forth). TC-PageFlip will load and display cells stored in either IFF or HAM format with overscan. You can also create a script file rather than naming each image. If there is not room on your floppy to store all the pictures, TC-PageFlip will prompt you to insert the next disk. The only feature absent from this module is the ability to load an anim file and display each frame.

The TimeLapse utility permits single-frame photography on such slow-moving subjects as clouds and blossoming flow- ►

ers. The window lets you set the delay between frames from three (most VTRs require at least three seconds for pre-roll) to 99 seconds. One of TimeLapse's gadgets lets you program a start time.

Transport Controller is designed to communicate with all software in Micro-Illusions' Photon Animation series (which includes Cel Animator), and with other third-party animation software such as VideoScape 3D (Aegis). When Transport Controller selects the module to be used, it creates a message port for communicating with other software. VideoScape 3D, for example, communicates by drawing a frame as part of an animation and sending a message to the message port to signify the completion of the frame. Upon reading this message, Transport Controller sends the appropriate codes to the controller, which then tells the VTR to record the frame. When the VTR is finished, the controller signals Transport Controller, which in turn signals VideoScape 3D to continue with the animation. The cycle repeats until the animation concludes.

Transport Controller also permits remote control of the VTR by displaying icons for play, shuttle, pause, and other operations. A repeat function performs the last edit again, and the program keeps track of edits performed by compiling a list in text format.

Photon Transport Controller's manual is one of the best I have encountered. The extensive Help section complements the on-line help feature, and a custom-programming section includes source code and examples on how to communicate with Transport Controller in assembly language and C.

To use Transport Controller, you need at least $7500 worth of equipment. Do not consider it unless you have, or have access to, a video studio. If you do, Transport Controller provides a significant link to the world of professional video animation and graphics.

Photon Video Transport Controller
MicroIllusions
17408 Chatsworth St.
Granada Hills, CA 91344
818/360-3715
800/522-2041
$299.95
Animation controller and videotape recorder required.

PhotoSynthesis

It doesn't make the flowers grow, but it might help graphics buffs develop greener thumbs.

By Morton A. Kevelson

UNLIKE MOST SOFTWARE, such as word processing where you both *create* text as well as manipulate it, image-processing programs involve operations applied only to existing images. While paint and drawing programs seem the most likely places from which to import graphics, it is really images from digitizers, satellites, and other sources where you have limited control over the quality of the originals that provide the *raison d'être* for image-processing software. PhotoSynthesis, from Escape Sequence Inc., provides this kind of control, allowing you to process images to enhance the information they contain.

Although PhotoSynthesis restricts its operations to lo-res (less than or equal to 320 × 200 pixels), it can manipulate images up to 16 bitplanes deep. This may seem somewhat superfluous, as the Amiga is able to display only images of five bitplanes or less (six in HAM and Extra HalfBrite modes). Keep in mind, however, that PhotoSynthesis is intended to process images from many sources. As with Digi-View (NewTek), which digitizes with 21 bits per pixel, PhotoSynthesis generates additional bitplanes as a result of its image-processing functions.

One of the real strengths of PhotoSynthesis is that it lets you work with up to four images at one time, so you can easily compare in mathematical fashion the processed images with the originals. The price you pay for all this image-handling capability, however, is that PhotoSynthesis is a very memory-intensive program. At 8000 bytes per bitplane, four 16-bitplane images require 512,000 bytes—all of the Amiga's chip RAM. In addition, PhotoSynthesis maintains a separate five-bitplane display buffer, and the program depends on the blitter to speed many operations (putting even more demands on chip RAM), so you ►

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will need at least a megabyte of memory to run it.

SETUP AND MENU SELECTION

PhotoSynthesis is not copy protected, and you can install it on a hard drive. To use it, you must go through a somewhat complex setup procedure. You must transfer one of the script files from the program disk to a copy of PhotoSynthesis. The script file you choose depends on a number of factors: Do you have a hard disk? If not, do you have a single- or dual-floppy drive system? Do you have more than or less than 2MB of RAM?

Because PhotoSynthesis makes heavy demands on chip RAM, the program requires a temporary storage area to swap chunks of data. If you have less than two megabytes of RAM, you will have to specify a SWAP: device—either RAM: (if you have enough), a floppy disk, or a hard drive. Those with only one disk drive and less than two megs will have to do a lot of disk swapping.

The recommended method for starting PhotoSynthesis is to boot it from its own work disk, but you can (and must if you have a hard drive) start it from the CLI. The appearance of a full-width window, tall enough to accommodate only a menu bar and a single line of text, indicates that PhotoSynthesis is running. For most operations you use either the menus or PhotoSynthesis' own CLI.

Menu operation in PhotoSynthesis could be improved. An example of the kinds of menu problems you may encounter involves specifying display parameters. PhotoSynthesis does not automatically display images (doing so uses valuable chip RAM). To display an image, you must select DISPLAY from the SYSTEM menu; you then get a requester, which contains gadgets for indicating buffer and bitplane settings. You click these to cycle through the selections, but if you overshoot the spot in the cycle you want, you cannot back up; you must keep clicking until the selection reappears. This happens even if you have only a single bitplane in the buffer. You can avoid this potential problem by using the program's CLI, but to do so you must learn the syntax. If you inadvertently enter an unusable parameter range, PhotoSynthesis puts up an error requester, which you must acknowledge with a mouse click. A screen flash would have been sufficient.

The remainder of the SYSTEM menu selections are: HIDE, which removes the image display; FLUSH, which clears a buffer; SCRIPT, which allows you to run a sequence of PhotoSynthesis commands from a script file; and QUIT.

PhotoSynthesis supports two image-file formats in addition to the Amiga's IFF (Interchange File Format) standard. The PhotoSynthesis format is similar to IFF, but it can represent gray levels as signed numbers (many PhotoSynthesis operations generate negative values). You can DUMP any image (or part of an image), as a sequence of values in scan-line format, and then use the DUMP to transfer it to another system. If you wish to read a dumped image, you must use another program utility. All file operations, including an option that sends up to five bitplanes to the printer, are offered via the Buffer menu.

The remaining menus contain the actual image-processing functions. The Boolean menu contains logical operators, including AND, OR, NOT, XOR, and MASK. You can designate any of the four buffers as source and destination for all of the logical operators. The Math menu contains ADD, SUBTRACT, MULTIPLY, DIVIDE, ABSVAL (absolute value), AVERAGE, and MEDIAN. The Neighborhood menu consists of CONVOLVE (mathematical convolution), EXPAND, SHRINK, THICKEN, THIN, and SKELETON. The RELATION menu contains LESS, GREAT, EQUAL, THRESHOLD, EXTRACT, MAXIMUM, and MINIMUM. The Misc menu wraps things up with HISTOGRAM, HISTEQUAL, LEVEL, SHIFT, and FIXBW.

IMAGE PROCESSING IN ACTION

PhotoSynthesis provides a complete set of image-processing operators. Those familiar with other Amiga image-processing software may notice the absence of descriptive functions such as EDGE and FILTER. These are actually high-level

continued on p. 78

Brown Wagh

SPOTLIGHT ON

MUSIC

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Developed By Circum Design

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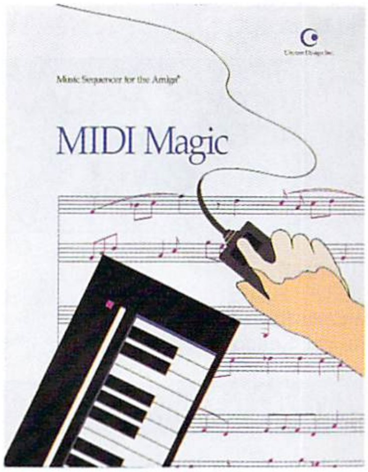
MIDI Magic provides a basic studio setup without complexity and extra expense. It excels in four areas — sound quality, features, Amiga utilization, and user interface.

Uninterrupted Music

To ensure uninterrupted music output, **MIDI Magic** gives top priority to the music. No matter what you are doing on the screen or with other multitasking applications, your music will always be rock steady.

Impressive Features

One sequencer cannot be all things to all musicians, however, **MIDI Magic**'s impressive list of features will provide a good, usable MIDI environment. Key features include multichannel simultaneous recording, 480 PPQN resolution, 4-mode quantization,



multiple time signatures, as well as realtime, modular or step modes. You can record any type of MIDI data onto 16 tracks with up to 26 sequences!

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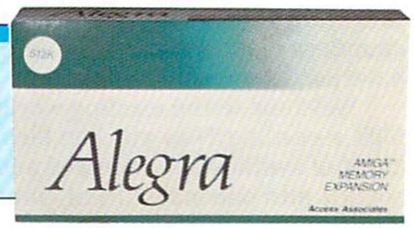
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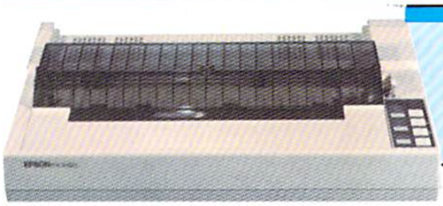
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from p. 74

functions that can be performed by combining two or more of PhotoSynthesis' low-level functions. For example, you can create edges by combining THRESHOLD, SHRINK, and XOR. To find the edges of the object in an image, try the following:

1. Load an image into buffer A and perform a THRESHOLD on it; place the result in buffer B. The result of a THRESHOLD is a binary image, or a single bitplane, where a pixel is turned on (set to a value of 1) only if the value of the corresponding pixel in the original image is greater than the THRESHOLD value. The resulting bitplane will have solid areas corresponding to objects in the original image.

2. Copy buffer B into buffer C.

3. Perform a SHRINK on buffer B and place the result in buffer B. The SHRINK operation examines a specified area around each pixel and replaces it by the minimum value in that area. This has the effect of cleaning up isolated points in the binary image.

4. Perform an XOR (exclusive OR) using buffers B and C, and place the result in buffer D. The XOR is a logical operation that compares the two bitplane images pixel by pixel. The resulting pixel is turned on only if the values of the two pixels are not the same. The resulting image in buffer D will consist of the edges of the areas to which the THRESHOLD operation was applied in step one.

5. If you wish to find the edges of different areas in the original image, simply repeat the process, starting with a different THRESHOLD setting.

Perhaps the most powerful part of PhotoSynthesis is the interpreter; it allows you to create and program image-processing algorithms and stores them in simple text files. The interpreter supports all menu commands as well as basic decision-making commands, including FOR-NEXT loops, REPEAT-UNTIL loops, and WHILE-ENDWHILE loops. Each loop can contain up to 10 individual loops, and can be up to five levels deep. Script files also support conditional structures, such as IF-ELSE-ENDIF, and they can call other script files up to five levels deep. A limited form of parameter passing is available when calling script files. Because many of PhotoSynthesis' operations can be time consuming, the support of script files adds a great deal of power to the system. Several sample script files are included with the program.

The manual contains a section on setting up PhotoSynthesis, a brief tutorial to introduce some operations, a short description of the interpreter, and a reference section. The appendices provide an introduction to image processing, a bibliography, and a brief description of the sample script files on the disk. I did, however, find several omissions and a number of errors in the manual, and I feel the interpreter and reference sections should be more detailed and fleshed out with additional examples.

PhotoSynthesis is not for everyone. It may be ideal for the image-processing professional, who will respond to the program's special CLI, its ability to run script files, and its mathematical approach to operations. Graphics artists and casual users, however, may feel more ►

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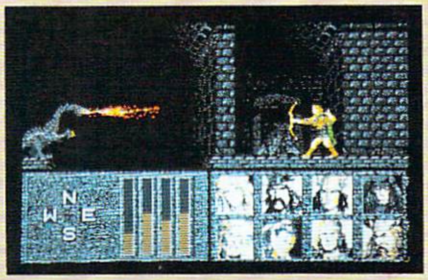
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DSM 1.0d

Sing the executable's song.

By Bryce Nesbitt

HAVE YOU EVER wanted to look inside an Amiga executable file—to see what makes it tick, fix a bug, or remove a feature? Maybe you don't trust your compiler's output and want to verify the assembly langauge. If so, you need DSM, the MC68000 disassembler.

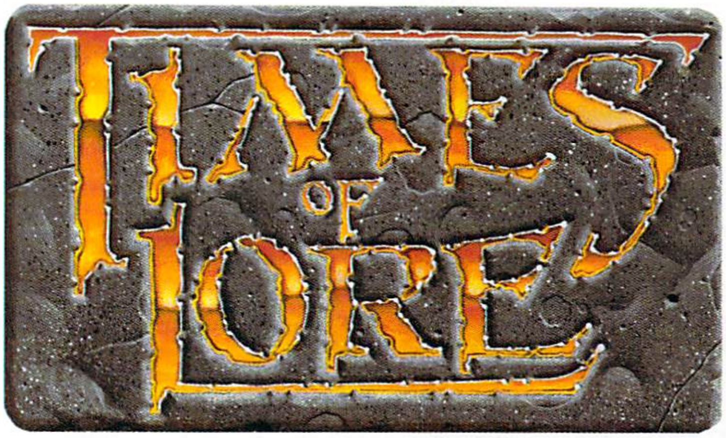
DSM can turn almost any executable Amiga file into 68000 source code. You can modify this source-code file to your heart's content and assemble it with any conventional Amiga assembler. If you are fortunate, the original file will contain symbol hunks left over from program development—hunks that include text from all labels present in the original source code and make disassembled code easy to read.

Using DSM, I fixed a commercial program that opened its window at the wrong location and did not allow it to be moved. DSM chewed through the program's executable file in under 30 seconds. I then loaded it into an editor, located the word OpenWindow, modified the proper flags, and reassembled the file. It worked perfectly. Total elapsed time: four minutes.

The otherwise-adequate manual does not address the fact that the file produced by DSM is often a different size than the original file. There are a couple of reasons for such a size discrepancy. Sometimes there are empty hunks left in the original file. In this case, the solution is to strip both files before comparing sizes (unfortunately, because DSM does not have this capacity, you will need a separate utility for stripping). If blank hunks are not to blame, the differential indicates a problem in processing which may be the fault of either the original assembler, the linker, or DSM.

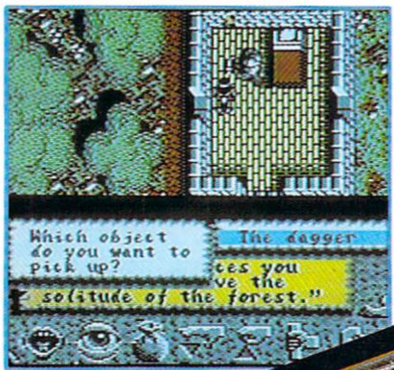
All Mixed Up

The process of disassembling a program is not straightforward or easy because programs are allowed to freely mix data, such as tables and strings, with code (compilers are known for haphazardly interleaving them). If data and code are combined in the disassembly, the result is difficult to read. The process is further complicated by code portions that are referenced from tables, self-modifying code, register indirection, and a number of other obscure programming methodologies. DSM combats these problems in an unusual manner—it actually traces the flow of the program. At the start, DSM assumes that the file contains nothing but data. It uses the first code hunk of a file (it must contain executable code) as an anchor point. DSM assumes that any branches or jumps point to more executable code. By walking down this tree, the disassembler guarantees it will never accidentally trip over something that is data and not code. It also virtually guarantees that ►



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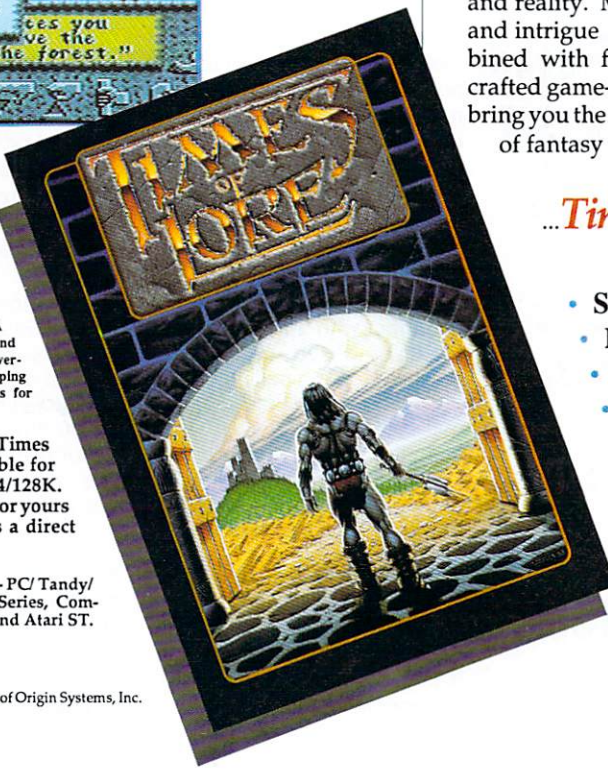
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some code will be mistaken for data.

DSM provides two mechanisms to deal with the leftovers that were wrongly treated as data. First is the -e flag, billed as an expert system. The -e flag tests questionable sections and tries to determine whether they are code. This usually works, but the system fails to recognize legal code in some cases. To back up the expert system, DSM goes one more step. You can specify explicitly, through the use of an offset file, that certain sections are to be treated as code. If a data section appears to contain a readable ASCII text string, it will be shown in that form.

Dented Armor

DSM has three major limitations. Because it can't handle files with overlays, the few complex programs that incorporate them are beyond DSM's reach. A more serious problem is that DSM refuses to disassemble anything other than a pure executable file (an object file, for instance, is out of the question). This limits DSM's utility to programmers who wish to examine compiler output. Lastly, DSM gives up whenever it encounters a program hunk it does not understand; therefore, DSM will not work with future hunk types that Commodore defines.

Aside from the fact that it crashed attempting to disassemble files containing overlays, DSM performed flawlessly. Whenever the reassembled program failed to match the original executable, the fault lay in the assembler, not DSM.

DSM does its job well. The non-copy-protected program works on all Amigas, including those with 68020 processor cards. I did not note any code-generating problems. Happily, OTG Software has indicated that it is dedicated to improving the program. DSM is an invaluable tool for the serious assembly-language developer.

DSM 1.0d
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GAME SHORTIES

Roadwars

AS WITH SO many computer games, the premise of Roadwars is pretty feeble—something about the 25th century and a planet with five moons linked by highways. Alas, the roads have begun to deteriorate, and you have been sent out to make them safe for tourists from the Federation. Ho hum.

The empty hyperbole of the diminutive instruction booklet fades with the opening screen of Roadwars. You find yourself tearing along at breakneck speed on a narrow, curving track encircling a planet that rotates above you. On either side of the road are panels to keep you on track, although missing sections raise the possibility of straying off into deep space.

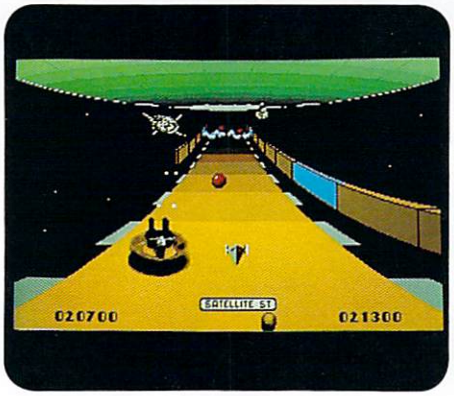
The marble-shaped battlesphere you pilot along this tortuous track looks innocuous enough until a click of the joystick's fire button slides a shield back, revealing a rotating cannon, your only weapon against a series of adversaries ►

who do their best to terminate your existence. Some of the side panels emit sparks and must be blasted to perdition to ensure your safety. Satellites drift languidly by, shooting lethal rays in your direction, while dangerous obstacles, both stationary and mobile, litter your path.

Aiding you in your mission in a one-player game is another battlesphere that joins you in blasting away at the nasties. Your erstwhile ally is not to be trusted too completely, however, as it tends to hog the road. I kept it from becoming too uppity by occasionally bumping it off the track and enjoying the resulting explosion (no wonder I can never find a bridge partner). Every four levels you wind up locked in a battle to the death with your former partner, bumping and blasting each other while dodging the usual hazards.

I have only a few complaints. One is an annoying sound track that can't be turned off. Another is the lack of a keyboard option and faulty mouse support; you'll need a joystick, which nixes dual-player mode unless you have two. Adjustable skill levels would also be welcome, as would an option to restart play where you left off (because it's so hard surviving the first few levels).

If frenetic energy coupled with great animation and sound effects in a blow-away-the-aliens game is your thing, Roadwars will prove satisfying. While a modicum of strategy is involved, this game will appeal most to hardcore arcade enthusiasts. *($34.99, Arcadia, distributed by Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, 415/571-7171. No special requirements.)*



Be a freeway vigilante in Roadwars.

—Chris Dickman

BATTLE CHESS

BATTLE CHESS BREATHES new life into the ancient game with 3-D animation.

The Battle Chess game pieces are detailed, three-dimensional, and fully animated. Each moves in a characteristic manner: The bishops glide, the queen slinks, the knights march, and the rooks stomp, all to the accompaniment of high-fidelity digitized sound. Battle Chess really shines, though, when one piece captures another. Although the outcome is preordained, the ensuing fight is nonetheless entertaining. The 36 different fighting senarios differ depending on the pieces involved. When a knight takes a knight, they go sword to sword. When a rook takes a queen, the rook turns into a monster and gobbles the queen. When queen takes pawn, lightning flies from her fingertips as the little guy tries to flee.

The 30-page manual covers basic moves and strategies and explains the game's numerous options. You can select from ten levels; the higher the level, the more time the computer spends thinking ►


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about its next move. (It beats me easily on levels four and above.) If you get impatient, you can force the computer to play. You can also specify a time limit per play, from one to 10,000 minutes, and save games to disk. Two options I found especially useful are Take Back (whereby you retract your last step) and Suggest Move (take suggestions from the computer). The 2-D board option, with its flat display, allows faster play because the game does not have to access the disk for animation and sound data. Serious chess players will appreciate the faster, less distracting mode when the animation novelty wears off.

You can play against the computer or a friend, or let the computer play itself. Battle Chess also offers a modem option, so you can compete long distance. (Surprisingly, though, the game supports only a modem baud rate of 300.) You can also use the modem option by connecting two Amigas via a serial cable.



Good knight! Just look at them fight!

The Battle Chess disk is not copy protected (the program does ask you for information from the manual upon bootup, though), and a provision lets you install the game on a hard drive, although this option got me into trouble.To install the game, your hard disk must be named DH0:—there is no provision for directing the path or device name. Because I use the Workbench 1.3 Fast File System on my hard drive, my DH0: partition is small (less than one megabyte) in accordance with Commodore's recommendation. When I clicked on the hard-disk install option, the drive ran for a while, then a requester popped up saying my drive was full. I selected cancel, which should have erased the portion of the program that was copied. When I typed the DIR command from my main hard-drive's C directory, I was told that my hard drive was no longer a DOS disk. Attempting to install Battle Chess erased the contents of my 40MB drive. When I reported the problem to Interplay, they told me they would look into it. So far I haven't heard back from them.

Despite these problems, I recommend the game. It is a clever, high-quality adaptation of a classic, and because it is so entertaining, it can entice people who don't already know chess to learn it. (I caught my children reading a chess tutorial in order to play the game.) Battle Chess is a winner. *($49.95, Interplay, distributed by Mediagenic, 3885 Bohannon Dr., Menlo Park, CA 94025, 415/329-0800. No special requirements.)*

—Louis R. Wallace

Sub Battle Simulator

SUB BATTLE SIMULATOR puts you at the helm of your choice of German and American World War II submarines. Your goal is to successfully complete one (or all) of 60 missions. The tasks, each of which is historically based, range from area patrols to seek-and-destroy missions. You can play them individually or embark upon a full wartime command starting in 1939 and continuing until the end of the war.

Sub Battle Simulator is primarily a one-screen game bordered by a control panel. The panel is replete with buttons, gauges, maps (one with zoom features), and surveillance devices, which you operate via the mouse or keyboard (a reference card aids you in navigating the keyboard). A number of weapons, including fore and aft torpedoes, mines, and deck and anti-aircraft guns, are at your disposal. You can monitor the enemy on the radar and sonar screens, or switch to an underwater view of your submarine and watch passing ships drop depth charges. Tedium-saving features let you compress time: Use the navigator to arrive at your destination quickly, and click on a single button to dive or surface almost immediately. You can select from four levels of difficulty. To get you started, there is a target-practice mode.

The key is to plan a strategy and operate your vessel properly. Virtually no ►

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skill is required to destroy enemy ships and planes—just aim, click the mouse button, and your target computer takes care of the rest. If you complete your mission, your score is based on the number of enemies destroyed.

Sub Battle appears to be an eight-bit game ported to the Amiga. While it features pull-down menus and digitized sounds, the graphics are not up to Amiga standards. The low-resolution block images that depict target ships and aircraft are often difficult to discern, and their movement is erratic.

Frequent and excessive disk access causes delays; while the program loads data from the disk, everything else stops. Because the game is copy protected, you cannot use RAM or a hard disk to increase speed. The delays are especially awkward when, during an attack by enemy aircraft, you cannot fire, submerge, or operate any controls.

The game's 32-page manual is easy to follow. It contains a glossary, reference section, and the specifications and capabilities of the various submarines. Unfortunately, the manual was written for the Macintosh. As the command card says, you must "note the differences between the manual and the Commodore Amiga version of the game."

While Sub Battle Simulator is a comprehensive simulation, the game falls short—especially by not taking advantage of the Amiga's power. *($39.95, Epyx, 600 Galveston Dr., Redwood City, CA 94063, 415/366-0606. No special requirements.)*

—Stephen E. King

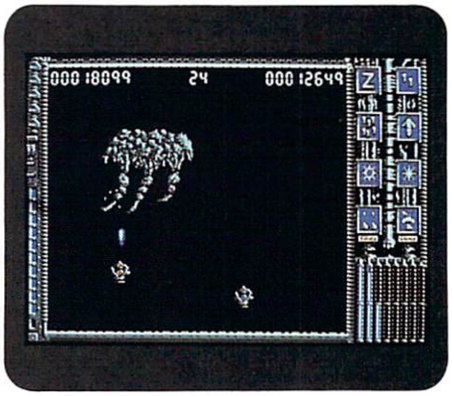
Brad Zoom in Better Dead Than Alien

BRAD ZOOM IN Better Dead Than Alien combines elements from some of the biggest arcade hits in history. As Brad Zoom, you must track and shoot scores of moving bug- and squid-like critters, robots, spaceships, monsters, and more.

Some screens are similar to Space Invaders: these feature rows of creatures that move down the screen from left to right while shooting at you. Like Galaxians, the enemies occasionally zoom in to attack you directly. If you manage to kill a glowing alien, a power pellet drops down. As in Arkanoid, catching the capsule gives you a temporary advantage such as increased energy, an extra ship, faster or more powerful guns, or a protective shield. You must be careful though; accidentally shooting a power pellet destroys it.

Other screens are reminiscent of Asteroids. Large, animated attackers break into many smaller entities when shot. These break into still tinier pieces that you can finally pick off with one hit. Meanwhile, though, you must avoid bumping into the many moving objects.

The third type of screen pits you against one of several gargantuan brutes (the neatest-looking beasties I have ever seen in a computer game) and their sidekicks. To win here you must destroy the big cheese, chunk by chunk, and all of his companions.



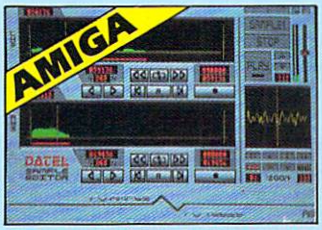
Be Brad Zoom and battle big beasties.

There are multiple screens on each of the many levels, and every level sports a new set of faster, tougher, and more aggressive creatures. You can start playing at any level provided you know its name. Because the names of the levels aren't listed, though, you must work through the game to learn them.

Better Dead Than Alien supports one or two players; in two-player mode you compete simultaneously for the high score. Each player has the choice of using a mouse, joystick, or keyboard. Unfortunately the game doesn't record high scores on disk. Once you start playing Better Dead Than Alien, however, you'll rarely want to turn your Amiga off! *($34.95, Discovery Software, 163 Conduit St., Annapolis, MD 21401, 301/268-9877. No special requirements.)*

—Louis R. Wallace ■

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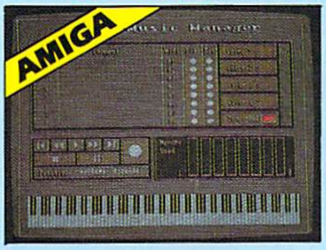




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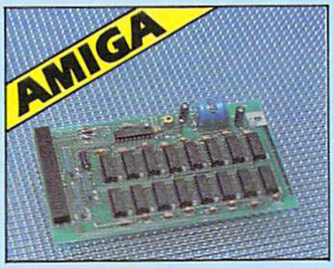


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WHAT'S NEW?

Quick, before the Visa bill comes! Treat yourself to a new gadget!

Compiled by Barbara Gefvert, Linda Barrett and Jan Jackson

Sum of the Parts

SYNERGY PERIPHERAL Systems annnounces **Hard Disk Plus**, a hard drive for the A500 with SCSI host/controller. You can get the unit in 20- and 30-meg configurations ($749.95 and $899.95, respectively), or in custom format, which includes the installation of any hard-drive you request. The unit comes with software utilities, and supports auto-booting and the Fast File System. An optional two-meg RAM add-on sells for $269.95.

A SCSI host/controller, hard-drive enclosure, power supply, cables, and software together make up the **Hard Disk CR** kit ($319.95) for the A500. Just add an embedded SCSI 3½-inch Seagate drive, and you've got yourself a complete system!

The **SCSI Host 2000** controller auto-configures, auto-boots from your hard disk, and supports the Fast File System. You can mount any 3½-inch slimline hard drive on the card, which retails for $179.95.

You can get the sum total, or any part, of this hardware line from Synergy Peripheral Systems, 5638 Allen Ave., Suite 3, San Jose, CA 95123, 408/972-2434.

Set to Roll

IN THE CLASSIC animation manner, **MovieSetter** lets you move characters around your scene, watching the sequences develop. To assemble your project, use the built-in movie-clip files, create your own 32-color images within the program, or import IFF graphics. Use the mouse to make your moves over static and scolling backgrounds. You can also generate sounds to accompany your scenes, then alter them and play them in stereo. Other features include color cycling, playback at up to 60 frames per second, linear and elliptical guides, and overscan. Get your presentations moving for $99; call Gold Disk, PO Box 789, Streetsville, Mississaugua, Ont., Canada L5M 2C2, 416/828-0913.



Get your ideas moving with MovieSetter.

Like the Plague

A ROBOT SPACESHIP is out of control, destroying planets as it speeds on a collision course with Earth. To save the world, you need only boot up **Pioneer Plague** ($39.95). A mixture of arcade action and long-range strategy, the HAM-mode game keeps you busy blasting away the enemies and programming space drones to help with the fight. For more information about the invasion, contact Antic Software, 544 Second St., San Francisco, CA 94107, 415/957-0886.

Don't Blink!

KEEP TABS ON your SCSI bus with **Blinky**. The unit, which mounts on the side of your A2000, connects with most SCSI controllers. Blinky's eight LED indicators let you know which of your SCSI devices are active as well as when your Amiga is communicating with them. Blinky is $74.95 from Computer System Associates, 7564 Trade St., San Diego, CA 92121, 619/581-0316.

Not So Alien

ALF (Amiga Loads Faster) aims to make interfacing the Amiga with an ST-412/506 hard disk "no problem." Available in MFM and RLL versions, the unit comes with an SMS-OMTI PC controller and cable. ALF claims to work with all PC-style hard drives, even damaged ones, and those formatted with the Fast File System. ALF even promises to warn you when it detects flipping bits on the drive, so you can make a backup before the ensuing crash. Adopt an ALF from Philgerma, Barerstrasse 32, 8000 Munchen 40, West Germany, 089/281228. ►

Roll Over Beethoven

RECORD, EDIT, AND manipulate four sounds simultaneously with **Pro*Sound Designer**, the digitizing, processing, and playback hardware/software system for all Amiga models. Pro*Sound lets you cut, paste, overlay, and change frequencies and octaves. You can play Pro*Sound-recorded samples as instrument voices on a MIDI keyboard or on the Amiga, and keep ten samples in memory. Because the hardware adapter uses second-generation sound-digitizing technology, it gives Pro*Sound a 1-32kHz frequency-response range with a high signal-to-noise ratio. Until March, you can trade in your current sound digitizer for a $50 discount from Pro*Sound's $159.95 retail price. Compose your questions and direct them to Precision Incorporated, 8404 Sterling St., Suite A, Irving, TX 75063, 214/929-4888.

Perform live on your Amiga with **M**, Intelligent Music's composing and performing program. You are just a click away from expressing your inspiration in real time while controlling rhythm, articulation, and orchestration. M automates changes in MIDI velocities, note densities, rhythms, legato-staccato articulations, and accents. With six alternate settings, M gives you six different ways to modify your music. M is available from Intelligent Music, 116 North Lake Ave., Albany, NY 12206, 518/434-4110 and retails at $200.

Billed as a rock-steady music sequencer, **MIDI Magic** by Circum Design provides a basic studio set-up that lets you record, play back, edit, and organize MIDI data generated by an electronic synthesizer. With multichannel simultaneous recording, 480 PPQN resolution, 4-mode quantization, and multiple time signatures, MIDI Magic ensures uninterrupted music output. You can record any type of MIDI data onto 16 tracks with up to 26 sequences. MIDI Magic is $149.95 from Brown-Wagh, 16795 Lark Ave., #210, Los Gatos, CA 95030, 408/395-8338.

Record your hits spontaneously with **MidiVU**, a multitasking musical scratch pad. MidiVU is designed to take up just two percent of a standard Amiga disk. This $29 desktop accessory records one track, in real time, from any MIDI instrument. Direct your questions to Diemer Development, 12814 Landale St., Studio City, CA 91604-1351, 818/762-0804.

A2000 Add-Ons

TWO NEW ARRIVALS from Commodore are the **A2058** memory expansion card, and the **A2090A** hard-disk controller. The RAM expander, $799, comes configured with two megabytes, and accepts up to six more megs of one-megabit DRAM chips. It fits into an A2000 slot. The A2090A controller, also for your A2000, provides ST-506 and SCSI interfaces, and buffered direct-memory access. It sells for $399. Get more information on the duo by calling Commodore, 1200 Wilson Dr., West Chester, PA 19380, 215/431-9100.

Search and Rescue

YOU ARE TRAVELLING through forests, graveyards, and city streets bracing against regimes of nasty characters. Heading for another day at the office? No, you are Sodan or Sodanna, one of the mighty fighting twins attempting to spring your parents held captive inside the evil castle Cragganmmor in Discovery Software's **Sword of Sodan**. For $49.95, you get three disks containing 11 levels. For more information call 800/34-AMIGA, Discovery Software International, 163 Conduit St., Annapolis, MD 21401.



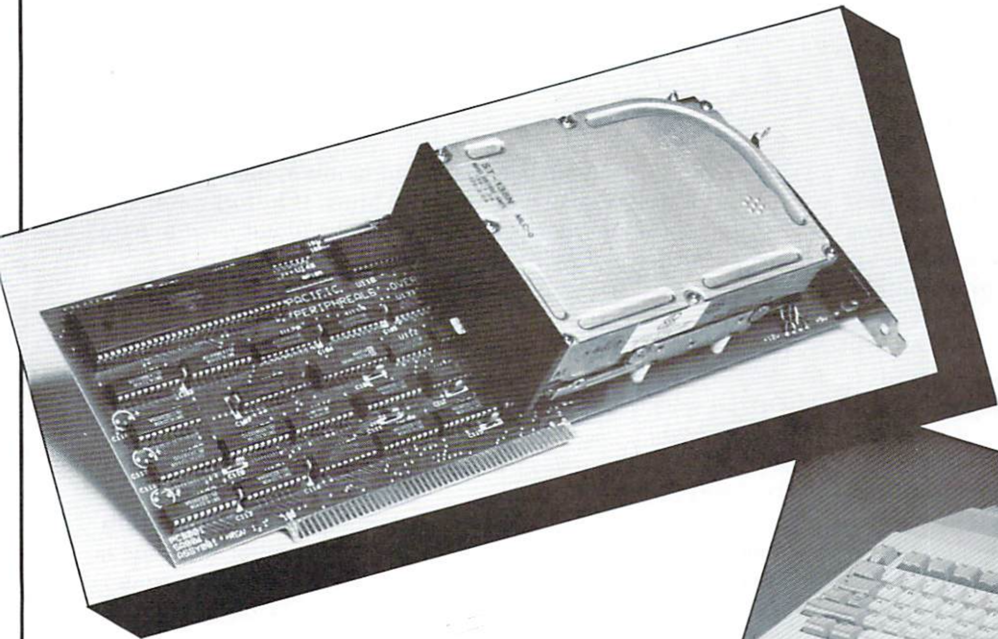
Fighting for dear ol' Mom's release.

Scanning the Globe

SPECTRASCAN GIVES your A2000 hi-res, color image capture and manipulation capabilities. The system, developed by ASDG, is based on the Sharp Electronics JX-450 color scanner and ASDG's Twin X General Purpose Input/Output Board (GPIB). The Sharp JX-450 will scan color originals up to 11 × 17 inches, as well as slides and negatives. It offers variable resolution from 30 to 300 dots per inch, and reports 24 bits per pixel for a proposed palette of 16-million colors. The SpectraScan software gives you complete control over the JX-450, and provides feedback as an image is scanned; all operations take place on screen in real time. Images larger than your monitor scroll, and ASDG promises fringe-free HAM graphics. SpectraScan's conversion capability extends to automatically remap a 24-bit-per-pixel image into any number of colors (not limited to powers of two) from two to 256. The demand-paged virtual memory environment, ASDG says, lets you manipulate the raw data for even a 52-meg image quickly and transparently with two megabytes of fast RAM and a sufficient hard drive. You can multitask, too. The system, complete with a SBX-GPIB module for the Twin-X board, all cables, and software, is $995. ASDG also distributes the scanner, which retails for $6995. You can reach ASDG at 925 Stewart St., Madison, WI 53713, 608/273-6585. ■

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OverDrive™

is the first "hardcard" design DMA SCSI hard drive controller for the A2000.

Mount a 3.5" SCSI drive to the OverDrive and save your drive bays for other uses...like the Konica 10 megabyte floppy drive. (See below.)

- The OverDrive uses a two-channel Motorola 68440 direct memory access chip to guarantee exceptional speed and compatibility with the Amiga's Motorola 68000 microprocessor.
- The OverDrive is autoconfig and compatible with Workbench 1.3 and 1.4, Fast File System and autobooting.
- A total of 7 devices can be added in various internal or external configurations.

With all of the above, you get the easiest to use software on the market. It is completely mouse driven, making the formatting process almost automatic.

Pacific Peripherals offers Seagate 30, 50 and 62 megabyte drives as well as the Konica 10 megabyte floppy. The Konica drive operates as a 75ms hard drive using high density (480 TPI) floppy disks giving you the speed of a hard drive and the unlimited capacity of a floppy drive. Exceptional error correction capabilities make your data safer than it would be on a standard 5¼" disk.

OverDrive only $249.00
OverDrive with:
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50 MB DRIVE
62 MB DRIVE *
KONICA *

*uses 5¼" drive bay

SubSystem 500™

is a two-slot expansion chassis for the A500 that uses cards designed for the A2000.

An optional 3.5" floppy drive may be added as an "external" drive but is, in fact, more convenient than any drive available for the A500 (including the A500 internal drive). The 100-pin "Zorro II" A2000 expansion cards are less expensive, more uniform in design and more available than pure A500 peripherals. (For example, try to find a DMA controller designed specifically for the A500. How about an A500 Bridgecard?) Rather than take power from the A500 power supply, the SubSystem comes standard with a 54-watt power supply.

SubSystem 500	$249.00
***SubSystem 500*/drive**	$399.00

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HELP KEY

Amidst the wreckage of champagne bottles, confetti, and noisemakers, New Year's Resolou vows to solve the problems of '89.

By Louis R. Wallace

OUT OF SIGHT

Q: *I have a public-domain disk with a subdirectory called CBM, containing what I believe to be several graphic screens. I have used every IFF loader I can think of (as well as LoadACBM) to view them, but nothing works. What is a CBM graphic format, and how can I view them?*

B. Arthur
San Antonio, TX

A: What I believe you have found are graphics created for the other Commodore (CBM) computer, the C-64. These are not IFF or ACBM format, and you cannot display them with programs made for IFF. There are several PD utilities that will convert C-64 DOODLE or KOALA pictures to IFF. Some of the best are ConvDDL (convert DOODLE), ConvKOA (convert Koala), and ConvPSG (convert PrintShop Graphic). Look for them in users' group libraries, bulletin board services, and commercial telecommunication networks like PeopleLink, GENIE, and QuantumLink.

MEMORY OR STORAGE

Q: *I need one megabyte of memory to run my software. Should I purchase a hard drive or a one-meg memory card for my A1000? What is the difference between the two?*

A. Whitmarsh
Des Moines, IA

A: A RAM expansion board contains RAM (Random Access Memory), which the computer uses to temporarily store programs and program information while it is processing the program. When you load a program, the system reads it from the disk drive into a portion of available RAM. The CPU then processes the program to perform its intended task. When you exit the program, the portion of RAM it occupied becomes available for other functions. When you turn the computer off, you erase everything in RAM.

A hard drive is a very different beast. You use a hard drive for long term storage of programs and data. A hard disk can store a great deal more information than a floppy disk, from 20 to 100 times more. Information stored on a hard drive remains there even when you turn off the power; only your command or a mechanical failure can erase it. You cannot run a program on the hard drive (or floppy) until you load it into the computer's memory. No matter how many megabytes of disk storage you have on the hard drive, if your computer does not have enough RAM to handle a program, you cannot use the program.

If you want to use programs that require one or more megabytes of RAM, buying a RAM expansion card should be your first priority. The mass storage capabilities of a hard drive are a convenience, not a necessity.

THE MINE OR THE SHAFT?

Q: *Two new Emerald Mine disks would not boot beyond the initial screen on my computer, but work fine on my friend's A1000. The dealer thinks my A1000 is developing a problem and should be serviced. Should I have the A1000 repaired (cost unknown), or trade it in on an A500 (the dealer will give me a $250 credit for it). This seems a convenient way of upgrading to more memory, Kickstart in ROM, and a battery-backed-up clock. Am I better off fixing the A1000 and buying RAM and a hard drive? Are A1000 hard drives and hardware going to come down in price, stay the same or go up? I am a little worried about future support for my A1000.*

R. Thomas
Wayne, MI

A: While Emerald Mine is a great game, its copy protection is picky. Like you, I could not load two Emerald Mine disks on my A1000, although they would load on other Amigas. If I disconnect my modem, however, both disks work. Your problem may not be modem related, but it could be caused by some other device hooked to the computer. Power down, disconnect everything except your disk drives and monitor, then boot Emerald Mine. If it works, you probably do not need to have the computer serviced.

If your A1000 does have a problem, should you repair it or trade it in towards the A500? For me, money would be the deciding factor. If the repair costs for the A1000 are less than the price of the A500, fixing the A1000 makes more sense. If the repairs are more costly, then go for the trade in.

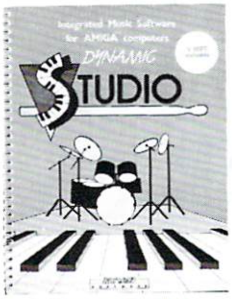
As for future hardware support for the A1000, only time will tell. The A1000 is still a significant part of the Amiga community. As their systems age, A1000 owners will be looking for ways to expand an otherwise excellent, almost fully software-compatible Amiga. I think the A1000 will find support for quite a while.

POKE AWAY

Q: *On the C-64, a few well aimed POKEs let you use a variable with GOSUB and GOTO statements in BASIC (X = linenumber:GOSUB X). Is there any way to do this with Amiga Basic?*

R. Bromley
Malton, Ontario

A: Amiga Basic does not allow computed GOTOs or GOSUBs, and it will take more than a few POKEs to change it. If anyone can pull off this Amiga Basic sleight of hand, write me a letter. I'll pass on the secret. ■



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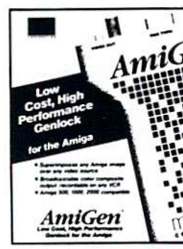
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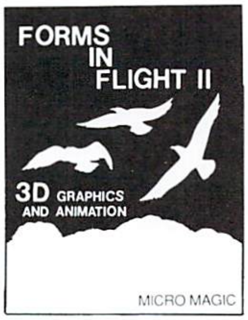


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THE TOP 10

☐ **#131 PacMan '87** - Great sound and graphics. Adds new elements to PacMan. Saves Top 10.
☐ **#127 Wheel of Fortune** - A great computer version for multiple players. It even talks.
☐ **#23 Monopoly** - Enjoy great graphics and sound while playing three tough computer opponents.
☐ **#37 Business Programs** - Included are an address book, an amortization program, a talking mail manager, and a label printer.
☐ **#27 Amoeba Invaders** - A better Space Invaders!
☐ **#140 Virus Killer** - Everyone needs this! Makes it easy to detect and eliminate known viruses.
☐ **#115 Word Processor** - Lots of features.
☐ **#134 Applications** - Label maker/printer, grocery list maker, and AMIGazer - a star viewing program.
☐ **#142 Q-Bert** - Like the popular arcade version.
☐ **#139 Bull Run** - Great Civil War strategy board game, with impressive graphics and sound.

THE BEST OF THE REST

BUSINESS/HOME

☐ **#116 Business II** - VC-Spreadsheet, HP-10c calculator, and several diversions for when the boss isn't looking!
☐ **#117 Business III** - DataBase, a bunch of great new fonts, RSLClock-great clock utility, AmigaSpell.

LANGUAGES

☐ **#9 FORTH** - Two versions of the FORTH programming language.
☐ **#50 XLISP** - A version of LISP, the artificial intelligence language. Includes documentation.

COMMUNICATIONS

☐ **#4 Communications** - Starterm and Aterm are both included. Both run from Workbench or CLI and are comparable to communications packages selling for $50+. Full control of baud rates, phone directory, all protocols, auto chop of files, and many other extras. Works well with the Avatex 1200 modem and others. Source code included.
☐ **#90 Modem Madness!** - Terminals include StarTerm, ATerm, and Kermit. Telecommunication utilities such as Archive are also here. Other types of programs and utilities are also included in the price of admission.

UTILITIES/APPLICATIONS

☐ **#60 AmigaBasic** - Two programs that are truly of commercial quality, Cell-Animate and Graphit. Some Deluxe Paint picture files are also included.
☐ **#97 Tutorial Disk1** - A disk full of information and programs to instruct Amiga Programmers and users. Several C & ASM source files are included.
☐ **#98 Tutorial Disk2** - More of the best of Amiga Information.
☐ **#101 Utilities** - Many new utilities like Timeset - a time setting utility and DirCopy-a great copier (very quick), and about a dozen more. Some new fonts are also included on this disk.
☐ **#105 Potpourri I** - This disk contains several different kinds of programs, some of the highlights are: PopCLI2-evokes a new CLI window at the press of a button; PSound-sample sound recorder and editor; 3-D Breakout; DiskCat-catalogs and organizes disk files; IconMaker-makes icons for most programs so that they can run from Workbench; FKey-template maker.
☐ **#129 Amiga Utilities II** - A hard disk backup; Target-sounds a gunshot whenever the left mouse button is pressed; Dpaint Tutor; WinSize-change window size from CLI easily, and lots more.
☐ **#130 Videomaker Utilities** - This disk is packed with utilities to make your desktop videos easier to produce and more professional looking.
☐ **#133 DOS Helper** - A program designed to help you with the AmigaDOS commands. Can be activated from icon of the CLI. Supports multitasking, so that you can refer to it when you need it. As usual, there are other good programs included on the disk.
☐ **#135 Applications II** - Long Movie-plays several IFF pictures in fast succession, creating animation. QuickBase-a mail manager DBase. Persmait-a DataBase for keeping records of friends, family, associates, customers or employees. MORE.
☐ **#146 Calendar** - A very good personal calender for birthdays, holidays, meetings, bills and other events. Excellent graphics. Calendar program also has a diary. Other programs include some graphics and Checkbook.
☐ **#150 Textcraft+ Demo** - A demo of a very good word-processing program of high quality. Menu driven. Has a lot of helps to show you how. Textcraft+ also has a Speller Check available.

SOUND/MUSIC

☐ **#18 Future Sound Demo** - Another great sound demo of digitized sound. Includes the wicked witch of OZ, breaking dishes, sea gulls, car crash, ducks, others.
☐ **#30 Super Sounds** - Great digitized sounds from movies like Star Trek, 2001, James Bond movies, Star Wars, and Starman, Is it real or is it the Amiga?!!!
☐ **#77 Instruments** - Turn your keyboard into 25 different musical instruments.

SLIDE SHOWS

☐ **#1 Norman Rockwell** - 17 beautiful digitized Rockwell paintings in this self-running slideshow presentation. You've got to see these!
☐ **#55 EA Demo and Polyscope** - More great graphics for your enjoyment.
☐ **#67 DPSlide8** - Over 30 slides of all sorts on this self-running slideshow.
☐ **#94 Diga-View** - This one shows the digitizing process in stages. Several good pictures are included. Other programs also included.
☐ **#95 DigaSlide11** - Another in the great series of slideshows with great artwork. Self-running with over 25 pictures.
☐ **#108B Juggler** - Famous demo that shows the beautiful graphics of the Amiga and just how powerful this program is. It is easier to run than 108A, but only has the one demo on it.

GAMES

☐ **#38 Basic GrabBag2** - Around 25 programs of various types. Many of these are must-haves. At less than $.20 each, you can't go wrong!
☐ **#44 Games3** - More great games including Life, Vegas Slot Machine, Reversi, others.
☐ **#52 Basic Games** - Tons of ABasic games - discover some treasures!
☐ **#61 ABasic GrabBag1** - Only about 100 of all types!!!!!
☐ **#102 Sinking Island** - Return to Sinking Island is an excellent adventure game. Well worth the price - hours of enjoyment!!!
☐ **#114 Potpourri X** - Othello, A key-shortcut program for AmigaDos. Various new tools, automatic printer-driver generator, much more.
☐ **#118 Great Graphic Games** - Includes Missle Command, 2-D Triclops, Cosmo-asteroids clone, BrakeOut, Yatzee, Hack and more.
☐ **#121 Backgammon** - A great game from David Addison.
☐ **#122 Solitaire** - Two versions by David Addison.
☐ **#123 Cribbage** - Take on the computer or a friend.
☐ **#124 Milestone** - A great computer version of Miles Bournes by the author of Monopoly for the Amiga, David Addison.
☐ **#125 Othello** - A great 3-D version of this popular game.
☐ **#128 Space Games** - Cosmoroids (like asteroids) and Gravity Wars highlight this disk just full of games.
☐ **#137 Blackjack** - A full-featured game which allows pair-splitting, double-down, etc. Bandit-play the slot machines without going to Vegas!!! More.
☐ **#141 Dominoes** - Dominoes game with great graphics. Also Tic Tac Toe, Drawing and Molecules programs.
☐ **#147 Jackland/Graphics** - Adventure clue game. Also some great pictures (graphics), a useful utility called Quickbase, and a fun program called Thingies which you will enjoy!!!
☐ **#148 Boulder Dash** - Very popular game with excellent graphics and has several challenging levels. This disk is full- It has Othello, Life3 and many useful utilities.
☐ **#151 4 in a Row** - A fun, but challenging game you play against the computer. There is an excellent Demo "MandFXP-D3", a utility or 2 and the fun TARGET - A weirdo thingy.

MISCELLANEOUS

☐ **#88 Amiga Basic Programs** - Over 50. Games, utilities, applications, entertainment, and finance. Also included is a program that allows you to use IFF files in your Amiga Basic programs.
☐ **#119 mCAD** - A full-featured computer-aided design program.
☐ **#136 Graphics2** - Border Set-useful for desktop publishing and video, making cards, coupons or menus, and your own artwork. Xicon-allows you to run AmigaDOS commands or programs from Icon.
☐ **#144 Christmas Animations** - 10 beautiful scenes and graphics with sound. Great scenes include: Lit Candle, Elves, The Christmas Tree, The Manger, Season's Greetings, Holly Wreath, Chimney Smoke, Church Bells, and Walking Home.
☐ **#145 Animations 3** - More Great Animations. 3 very good demos plus 3 workbench pictures and Blobs.

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from p. 56

```
#define GID_GREEN 8
#define GID_BLUE 9
#define GID_YELLOW10
#define GID_MAGENTA 11
#define GID_CYAN 12
/* Shared Routines */
extern void Setup(), CloseUpShop();
extern void DoLine(), DoRect(), DoElli();
```

Listing 3. Drawset.c

```
/* LittleDraw Setup--Initialize Screen, IDCMP I/O */
#include <exec/types.h>
#include <exec/exec.h>
#include <graphics/gfx.h>
#include <graphics/view.h>
#include <graphics/rastport.h>
#include <intuition/intuition.h>
#include "draw.h"
/* Global Data Structures */
struct IntuitionBase *IntuitionBase;
struct GfxBase *GfxBase;
struct TextAttr ffont =
{"topaz.font", TOPAZ_SIXTY, FS_NORMAL, FPF_ROMFONT};
struct NewScreen newscr =
{ 0,0, WIDTH, HEIGHT, DEPTH, BLACK, WHITE, HIRES,
  CUSTOMSCREEN, &ffont, "Little Draw", NULL, NULL };
struct NewWindow newwin;
struct Window *win;
struct Screen *scr;
struct BitMap *bitm;
struct RastPort *rp;
long MyIDCMP_Flags; /* For ModifyIDCMP calls */
/* Close-up-shop Bits, mask */
#define CL_GFXLIB 0x0001
#define CL_INTLIB 0x0002
#define CL_SCREEN 0x0004
#define CL_BITMAP 0x0008
#define CL_IMAGES 0x0010
#define CL_WINDOW 0x0020
unsigned long close_mask = 0;
/* Gadget and Requester Definitions */
/* Gadget Image Structs */
struct Image Line_Image = {
0,0, GAD_WIDTH, GAD_HEIGHT,1,Line_Pict,0x1,0x0,NULL};
struct Image Rect_Image = {
0,0, GAD_WIDTH, GAD_HEIGHT,1,Rect_Pict,0x1,0x0,NULL};
struct Image Elli_Image = { 0,0, GAD_WIDTH,
GAD_HEIGHT, 1, Elli_Pict, 0x1, 0x0, NULL};
/* Color Images - use PlanePick and PlaneOnOff */
/* alone for image, except for Black        */
struct Image Black_Image = { 0,0,GAD_WIDTH,
GAD_HEIGHT, 5, Black_Pict, 0x1, BLACK, NULL};
struct Image White_Image = {
0,0,GAD_WIDTH,GAD_HEIGHT,5,NULL,0x0,WHITE,NULL};
struct Image Red_Image = {
0,0,GAD_WIDTH,GAD_HEIGHT,5,NULL,0x0,RED,NULL};
struct Image Green_Image = {
0,0,GAD_WIDTH,GAD_HEIGHT,5,NULL,0x0,GREEN,NULL};
struct Image Blue_Image = {
0,0,GAD_WIDTH,GAD_HEIGHT,5,NULL,0x0,BLUE,NULL};
struct Image Yellow_Image = {
0,0,GAD_WIDTH,GAD_HEIGHT,5,NULL,0x0,YELLOW,NULL};
struct Image Magenta_Image = {
0,0,GAD_WIDTH,GAD_HEIGHT,5,NULL,0x0,MAGENTA,NULL};
struct Image Cyan_Image = {
0,0,GAD_WIDTH,GAD_HEIGHT,5,NULL,0x0,CYAN,NULL};
/* Gadget structs in bottom-to-top order */
/* Color Gadgets */
struct Gadget Cyan_Gad = { NULL,
0,(GAD_HEIGHT*11+GAD_TOPOFF), GAD_WIDTH,GAD_HEIGHT,
GADGHCOMP | GADGIMAGE, RELVERIFY, BOOLGADGET, (APTR)
&Cyan_Image, NULL, NULL, 0L, NULL, GID_CYAN, NULL};
struct Gadget Magenta_Gad = { &Cyan_Gad,
0,(GAD_HEIGHT*10+GAD_TOPOFF),GAD_WIDTH,GAD_HEIGHT,
GADGHCOMP | GADGIMAGE, RELVERIFY, BOOLGADGET, (APTR)
&Magenta_Image, NULL, NULL, 0L, NULL, GID_MAGENTA,
NULL};
struct Gadget Yellow_Gad = { &Magenta_Gad,0,
(GAD_HEIGHT*9+GAD_TOPOFF), GAD_WIDTH, GAD_HEIGHT,
GADGHCOMP | GADGIMAGE, RELVERIFY, BOOLGADGET,(APTR)
&Yellow_Image, NULL, NULL, 0L, NULL, GID_YELLOW,
NULL};
struct Gadget Blue_Gad = {
  &Yellow_Gad,0,(GAD_HEIGHT*8+GAD_TOPOFF),GAD_WIDTH,
GAD_HEIGHT, GADGHCOMP | GADGIMAGE, RELVERIFY,
BOOLGADGET, (APTR) &Blue_Image, NULL, NULL, 0L, NULL,
GID_BLUE, NULL};
struct Gadget Green_Gad = {
  &Blue_Gad, 0,(GAD_HEIGHT*7+GAD_TOPOFF), GAD_WIDTH,
GAD_HEIGHT, GADGHCOMP | GADGIMAGE, RELVERIFY,
BOOLGADGET, (APTR) &Green_Image, NULL, NULL, 0L, NULL,
GID_GREEN, NULL};
struct Gadget Red_Gad = {
  &Green_Gad,0,(GAD_HEIGHT*6+GAD_TOPOFF), GAD_WIDTH,
GAD_HEIGHT, GADGHCOMP | GADGIMAGE, RELVERIFY,
BOOLGADGET, (APTR) &Red_Image, NULL, NULL, 0L, NULL,
GID_RED, NULL};
struct Gadget White_Gad = {
  &Red_Gad, 0,(GAD_HEIGHT*5+GAD_TOPOFF), GAD_WIDTH,
GAD_HEIGHT, GADGHCOMP | GADGIMAGE, RELVERIFY,
BOOLGADGET, (APTR) &White_Image, NULL, NULL, 0L, NULL,
GID_WHITE, NULL};
struct Gadget Black_Gad = {
  &White_Gad, 0,(GAD_HEIGHT*4+GAD_TOPOFF), GAD_WIDTH,
GAD_HEIGHT, GADGHCOMP | GADGIMAGE, RELVERIFY,
BOOLGADGET, (APTR) &Black_Image, NULL, NULL, 0L, NULL,
GID_BLACK, NULL};
/* Drawing Gadgets */
struct Gadget Elli_Gad = {
  &Black_Gad, 0,(GAD_HEIGHT*3+GAD_TOPOFF), GAD_WIDTH,
GAD_HEIGHT, GADGHCOMP | GADGIMAGE, RELVERIFY,
BOOLGADGET, (APTR) &Elli_Image, NULL, NULL, 0L, NULL,
GID_ELLI, NULL};
struct Gadget Rect_Gad = {
  &Elli_Gad, 0,(GAD_HEIGHT*2+GAD_TOPOFF),GAD_WIDTH,
GAD_HEIGHT, GADGHCOMP | GADGIMAGE, RELVERIFY,
BOOLGADGET, (APTR) &Rect_Image, NULL, NULL, 0L, NULL,
GID_RECT, NULL};
struct Gadget Line_Gad = {
  &Rect_Gad, 0,GAD_HEIGHT+GAD_TOPOFF, GAD_WIDTH,
GAD_HEIGHT, GADGHCOMP | GADGIMAGE, RELVERIFY,
BOOLGADGET, (APTR) &Line_Image, NULL, NULL, 0L, NULL,
GID_LINE, NULL};
/*  Utility Functions */
extern long Wait(), CloseLibrary(), CloseWindow();
extern APTR OpenLibrary(), AllocMem(),
            AllocRaster();
extern struct Screen *OpenScreen();
extern struct Window *OpenWindow();
/* Code */
void Setup ()
{
    int i,j;
    if (!(GfxBase = (struct GfxBase *)
         OpenLibrary("graphics.library",1))) {
         printf("Cannot open graphics library\n");
         exit(1);
    }
    if (!(IntuitionBase = (struct IntuitionBase *)
        OpenLibrary("intuition.library",1)) ) {
         CloseLibrary(GfxBase);
         printf("Cannot open Intuition\n");
         exit(1);
    }
    close_mask = CL_GFXLIB | CL_INTLIB;
    if ((scr = (struct Screen *) OpenScreen
       (&newscr)) == NULL) {
         printf("Cannot open screen\n");
         CloseUpShop();  exit(1);
    }
  close_mask |= CL_SCREEN;
  SetRGB4 (&(scr->ViewPort), BLACK, 0x0, 0x0, 0x0);
  SetRGB4 (&(scr->ViewPort), WHITE, 0xf, 0xf, 0xf);
```

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Circle 125 on Reader Service card.

```
  SetRGB4 (&(scr->ViewPort), RED,    0xf, 0x0, 0x0);
  SetRGB4 (&(scr->ViewPort), GREEN, 0x0, 0xf, 0x0);
  SetRGB4 (&(scr->ViewPort), BLUE,   0x0, 0x0, 0xf);
  SetRGB4 (&(scr->ViewPort), YELLOW, 0xf, 0xf, 0x0);
  SetRGB4 (&(scr->ViewPort), MAGENTA, 0xf, 0x0, 0xf);
  SetRGB4 (&(scr->ViewPort), CYAN, 0x0, 0xf, 0xf);
  if ((bitm = (struct BitMap *) AllocMem (sizeof(
         struct BitMap), MEMF_CHIP)) == NULL) {
         printf("Insufficient memory for bitmap\n");
         CloseUpShop();  exit(1);
    }
    InitBitMap (bitm, DEPTH, WIDTH, HEIGHT);
    for (i=0; i<DEPTH; i++) {
         if ((bitm->Planes[i] = (PLANEPTR)
           AllocRaster(WIDTH, HEIGHT)) == NULL)
        {
        for(j=0; j<i; j++)
        FreeRaster(bitm->Planes[j], WIDTH,
             HEIGHT);
        FreeMem (bitm, sizeof(struct BitMap));
        printf("Insufficient memory for rasters\n");
        CloseUpShop();  exit(1);
        }
        BltClear (bitm->Planes[i], (WIDTH / 8) *
          HEIGHT, 1);
    }
  close_mask |= CL_BITMAP;
  newwin.LeftEdge = 0; newwin.TopEdge = 0
  newwin.Width = WIDTH; newwin.Height = HEIGHT;
  newwin.DetailPen = WHITE; newwin.BlockPen = BLACK;
  newwin.IDCMPFlags = CLOSEWINDOW | GADGETUP;
  MyIDCMP_Flags = newwin.IDCMPFlags;
  newwin.Flags = WINDOWDEPTH | WINDOWCLOSE |
     RMBTRAP | SUPER_BITMAP | BORDERLESS | ACTIVATE;
  newwin.FirstGadget = &Line_Gad;
  newwin.CheckMark = NULL;
  newwin.Title = (UBYTE *) "LittleDraw";
  newwin.Screen = scr; newwin.BitMap = bitm;
  newwin.MinHeight = MINHEIGHT; newwin.MinWidth =
    MINWIDTH;
  newwin.MaxHeight = HEIGHT; newwin.MaxWidth = WIDTH;
  newwin.Type = CUSTOMSCREEN;
  if ((win = (struct Window *) OpenWindow(&newwin))
       ==  NULL) {
   printf("could not open the window\n");
   CloseUpShop();  exit(2);
   }
   close_mask |= CL_WINDOW;
   rp = win->RPort;
   SetAPen(rp, WHITE);
} /* Setup */
void CloseUpShop()
{
   int j;
   if (close_mask & CL_WINDOW)
      CloseWindow (win);
   if (close_mask & CL_SCREEN)
      CloseScreen (scr);
   if (close_mask & CL_BITMAP) {
   for(j=0; j<DEPTH; j++)
       FreeRaster(bitm->Planes[j],WIDTH,HEIGHT);
       FreeMem (bitm, sizeof(struct BitMap));
   }
   if (close_mask & CL_INTLIB)
      CloseLibrary (IntuitionBase);
   if (close_mask & CL_GFXLIB)
      CloseLibrary (GfxBase);
   OpenWorkBench();
}
```

Listing 4. Drimages.c

```
/* LittleDraw Images Images to Compile for CHIP
Memory  Compile with "lc -ad drimages", to load
images into CHIP mem. */
#include <exec/types.h>
#include "draw.h"
/* Gadget Images - here for compiler to set */
USHORT Line_Pict[GAD_HEIGHT] =
{ 0x0000, 0x0008, 0x0018, 0x0030, 0x0060, 0x00C0,
  0x0180, 0x0300, 0x0600, 0x0C00, 0x1000, 0x0000};
USHORT Rect_Pict[GAD_HEIGHT] =
{ 0x0000, 0X3FFC, 0x300C, 0x300C, 0x300C, 0x300C,
  0x300C, 0x300C, 0x300C, 0x300C, 0x3FFC, 0x0000};
USHORT Elli_Pict[GAD_HEIGHT] =
{ 0x0000, 0x07C0, 0x0C60, 0x1830, 0x3030, 0x1010,
  0x1010, 0x3030, 0x1030, 0x0C60, 0x07C0, 0x0000};
USHORT Black_Pict[GAD_HEIGHT] =
{ 0x0000, 0X0FF0, 0x0000, 0x0000, 0x8001, 0x8001,
  0x8001, 0x8001, 0x0000, 0x0000, 0x0FF0, 0x0000};
/* Custom Mouse Pointer Images (2 planes) */
USHORT CrossHair_Pict[] =
{ 0x0,0x0,     0x1C00,0x0, 0x0800,0x0, 0x0800,0x0,
  0x8880,0x0, 0xF780,0x0, 0x8880,0x0, 0x0800,0x0,
  0x0800,0x0, 0x1C00,0x0, 0x0,0x0};
```

Listing 5. Drawop.c

```
/* LittleDraw Operations
  Handle User Requests, Draw Objects */
#include <exec/types.h>
#include <exec/exec.h>
#include <graphics/gfx.h>
#include <graphics/clip.h>
#include <graphics/view.h>
#include <graphics/rastport.h>
#include <graphics/gfxmacros.h>
#include <intuition/intuition.h>
#include <math.h>
#include "draw.h"
/* Keys */
#define KEY_BS    0x08
#define KEY_NL    0x0A
#define KEY_CR    0x0D
#define KEY_CTRLX 0x18
/* Min, max positions for drawing, chars, sizes */
#define DR_XMIN    GAD_WIDTH
#define DR_XMAX    (WIDTH-1)
#define DR_YMIN    10   /* Border */
#define DR_YMAX    (HEIGHT-1)
#define TX_XMIN    DR_XMIN
#define TX_YMIN    (DR_YMIN+9) /* + char ht */
#define TX_XMAX    (WIDTH-10)
#define TX_YMAX    (HEIGHT-5)
#define TX_XSIZE    9 /* Topaz 60/line font */
/* Global Variables (to this file) */
USHORTLDrawState = S_Nothing; /* Drawing State */
int LDrawColor = WHITE;
void main() {
    struct IntuiMessage *msg;    /* Latest req */
    ULONG msgclass, msgcode;
    struct Gadget *msggad;
    Setup();
    for(;;) {    /* do this until user quits */
       if ((msg = (struct IntuiMessage *)
           GetMsg(win->UserPort)) == NULL) {
             Wait (1 << win->UserPort->mp_SigBit);
             continue;
             }
         msgclass = msg->Class;  msgcode = msg->Code;
         msggad = (struct Gadget *) (msg->IAddress);
         ReplyMsg(msg);
         switch (msgclass) {
          case CLOSEWINDOW :
             CloseUpShop();
             exit (0);
          case GADGETUP:
               do  /* Draw-er may terminate */
               {   /*  on another GADGETUP */
               msgclass = 0;
               switch (msggad->GadgetID) {
                   case GID_LINE:
```

►

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Circle 128 on Reader Service card.

```
                    DoLine (&msgclass, &msgcode,
                      &msggad);
                    break;
                   case GID_RECT:
                    DoRect (&msgclass, &msgcode,
                      &msggad);
                    break;
                   case GID_ELLI:
                    DoElli (&msgclass, &msgcode,
                      &msggad);
                    break;
                   case GID_BLACK:
                     LDrawColor = BLACK;
                    SetAPen(rp, BLACK);
                    break
                   case GID_WHITE:
                    LDrawColor = WHITE;
                    SetAPen(rp, WHITE);
                    break;
                    case GID_RED:
                    LDrawColor = RED;
                    SetAPen(rp, RED);
                    break;
                   case GID_GREEN:
                    LDrawColor = GREEN;
                    SetAPen(rp, GREEN);
                    break;
                   case GID_BLUE:
                    LDrawColor = BLUE;
                    SetAPen(rp, BLUE);
                    break;
                   case GID_YELLOW:
                    LDrawColor = YELLOW;
                    SetAPen(rp, YELLOW);
                    break;
                   case GID_MAGENTA:
                    LDrawColor = MAGENTA;
                    SetAPen(rp, MAGENTA);
                    break;
                   case GID_CYAN:
                    LDrawColor = CYAN;
                    SetAPen(rp, CYAN);
                    break;
                   default:
                    break;
               } /* end GID switch */
               if (msgclass == CLOSEWINDOW)
               {
                   CloseUpShop();
                   exit(0);
               }
               } while (msgclass != 0);
          default:
/* Will catch MOUSEBUTTONS and  */
/* VanillaKeys, too */
          break;
        } /* switch */
     } /* for */
}
/* Function - DoLine ()
     Draw Rubber Band Line between SELECTDOWN
     and SELECTUP */
void DoLine (termclass, termcode, termgad)
     ULONG *termclass;
     ULONG *termcode;
     struct Gadget **termgad;
{
    struct IntuiMessage *msg; /* Latest req */
    int begx, begy, lastx, lasty, mx, my;
    LDrawState = S_WaLine;
    ModifyIDCMP (win, MyIDCMP_Flags | MOUSEBUTTONS);
        /* To keep Lattice from complaining about */
        /* uninitialized auto variables!  */
    begx = begy = lastx = lasty = 0;
    for(;;) { /* do this until user finished */
       if ((msg = (struct IntuiMessage *)
          GetMsg(win->UserPort)) == NULL) {
             Wait (1 << win->UserPort->mp_SigBit);
```

```
            continue;
        }
*termclass = msg->Class;  *termcode = msg->Code;
*termgad = (struct Gadget *) (msg->IAddress);
/* Constrain position to bounds */
mx = min(msg->MouseX, DR_XMAX);
mx = max(mx, DR_XMIN);
my = min(msg->MouseY, DR_YMAX);
my = max(my, DR_YMIN);
ReplyMsg(msg);
    switch (*termclass) {
     case CLOSEWINDOW:
     case GADGETUP:
         ModifyIDCMP (win, MyIDCMP_Flags);
         ClearPointer (win);
         LDrawState = S_Nothing;
         return;
     case MOUSEBUTTONS:
         switch (*termcode)
         {
           case SELECTDOWN:
              begx = lastx = mx;
              begy = lasty = my;
              ModifyIDCMP(win, MyIDCMP_Flags |
               MOUSEBUTTONS | INTUITICKS);
              LDrawState = S_1stLine;
              SetPointer (win, CrossHair_Pict,
               CROSSWIDTH, CROSSHEIGHT,
               CROSSXOFF, CROSSYOFF);
              break;
            case SELECTUP:
              ModifyIDCMP (win, MyIDCMP_Flags
               | MOUSEBUTTONS);
              if ((LDrawState != S_DrLine) &&
               (LDrawState != S_1stLine))
               break;
               else if (LDrawState == S_DrLine)
              {   /* Erase Prev Line */
               Move (rp, begx, begy);
               Draw (rp, lastx, lasty);
               }
              /* Draw final line */
              SetDrMd (rp, JAM1);
              Move (rp, begx, begy);
              Draw (rp, mx, my);
              ClearPointer (win);
              LDrawState = S_WaLine;
              break;
            case MENUUP:
            case MENUDOWN:
                /* Cancel current line  */
             ModifyIDCMP (win, MyIDCMP_Flags
              | MOUSEBUTTONS);
             if (LDrawState == S_DrLine)
             {  /* Line started; */
              /*   erase it    */
              Move (rp, begx, begy);
              Draw (rp, lastx, lasty);
              }
             ClearPointer (win);
             LDrawState = S_WaLine;
             break;
          } /* end MOUSEBUTTONS switch */
         break;
    case INTUITICKS:
        if ((lastx == mx) && (lasty == my))
         break; /* Skip draw */
        else if(LDrawState == S_1stLine)
        {  /* First line */
         SetDrMd (rp, COMPLEMENT);
         LDrawState = S_DrLine;
         }
         else /* Clear prev line */
         {
         Move (rp, begx, begy);
         Draw (rp, lastx, lasty);
        }
        Move (rp, begx, begy);     ►
```

Circle 206 on Reader Service card.

Circle 78 on Reader Service card.

```
            Draw (rp, mx, my);
            lastx = mx; lasty = my;
            break;
          default:
            break;
        }   /* switch */
    } /* for(;;) */
} /* DoLine */
/* Function - DoRect ()
        Draw Rubber Band Rectangle between
        SELECTDOWN and SELECTUP */
void DoRect (termclass, termcode, termgad)
    ULONG *termclass, *termcode;
    struct Gadget **termgad;
{
    struct IntuiMessage *msg;  /* Latest req */
    int begx, begy, lastx, lasty, mx, my;
    LDrawState = S_WaRect;
    ModifyIDCMP (win, MyIDCMP_Flags | MOUSEBUTTONS);
    begx = begy = lastx = lasty = 0;
    for(;;) {
       if ((msg = (struct IntuiMessage *)
         GetMsg(win->UserPort)) == NULL) {
         Wait (1 << win->UserPort->mp_SigBit);
         continue;
      }
 *termclass = msg->Class;  *termcode = msg->Code;
    *termgad = (struct Gadget *) (msg->IAddress);
        /* Constrain position to bounds */
    mx = min(msg->MouseX, DR_XMAX);
    mx = max(mx, DR_XMIN);
    my = min(msg->MouseY, DR_YMAX);
    my = max(my, DR_YMIN);
    ReplyMsg(msg);
       switch (*termclass)
       {
         case CLOSEWINDOW:
         case GADGETUP:
             ModifyIDCMP (win, MyIDCMP_Flags);
             ClearPointer (win);
             LDrawState = S_Nothing;
             return;
         case MOUSEBUTTONS:
             switch (*termcode)
             {
              case SELECTDOWN:
                begx = mx;  begy = my;
                   ModifyIDCMP(win, MyIDCMP_Flags |
                     MOUSEBUTTONS | INTUITICKS);
                  LDrawState = S_1stRect;
                  SetPointer (win, CrossHair_Pict,
                   CROSSWIDTH, CROSSHEIGHT,
                   CROSSXOFF, CROSSYOFF);
                  break;
            case SELECTUP:
               ModifyIDCMP (win, MyIDCMP_Flags
                 | MOUSEBUTTONS);
                  if ((LDrawState != S_DrRect) &&
                  (LDrawState != S_1stRect))
                  break;
                  else if (LDrawState == S_DrRect)
                  {  /* Clear prev image *7
                   Move (rp, begx, begy);
                   Draw (rp, lastx, begy);
                   Draw (rp, lastx, lasty);
                   Draw (rp, begx, lasty);
                   Draw (rp, begx, begy);
                  }
                  SetDrMd (rp, JAM1);
                  lastx = min(begx,mx);
                  mx = max(begx,mx);
                  lasty = min(begy,my);
                  my = max(begy,my);
                  RectFill (rp, lastx, lasty,
                   mx, my);
                  ClearPointer (win);
                  LDrawState = S_WaRect;
                  break;
              case MENUUP:
```

```
                case MENUDOWN:
                    /* Cancel current rect */
                    ModifyIDCMP (win, MyIDCMP_Flags
                      | MOUSEBUTTONS);
                    if (LDrawState == S_DrRect)
                    {     /* Rect started; zap it */
                     Move (rp, begx, begy);
                     Draw (rp, lastx, begy);
                     Draw (rp, lastx, lasty);
                     Draw (rp, begx, lasty);
                     Draw (rp, begx, begy);
                    SetDrMd (rp, JAM1);
                    }
                   ClearPointer (win);
                   LDrawState = S_WaRect;
                   break;
                } /* end MOUSEBUTTONS switch */
              break;
          case INTUITICKS:
             if ((lastx == mx) && (lasty == my))
              break;
              else if (LDrawState == S_1stRect)
              { /* First rect */
              SetDrMd (rp, COMPLEMENT);
              LDrawState = S_DrRect;
              Move (rp, begx, begy);
              }
             else     /* Second or later. Erase prev */
             {
              Draw (rp, lastx, begy);
              Draw (rp, lastx, lasty);
              Draw (rp, begx, lasty);
              Draw (rp, begx, begy);
             }
             Draw (rp, mx, begy);
             Draw (rp, mx, my);
             Draw (rp, begx, my);
             Draw (rp, begx, begy);
             lastx = mx; lasty = my;
             break;
         default:
             break;
       } /* switch */
     } /* for(;;) */
} /* DoRect */
/* Function - DoElli ()
      Draw/Enlarge/Shrink Ellipse between
     SELECTDOWN (set center) and SELECTUP. */
void DoElli (termclass, termcode, termgad)
    ULONG *termclass, *termcode;
    struct Gadget **termgad;
{
    struct IntuiMessage *msg; /* Latest req */
    int begx, begy, mx, my;
    int rx, ry;   /* Ellipse radii */
    LDrawState = S_WaElli;
    ModifyIDCMP (win, MyIDCMP_Flags | MOUSEBUTTONS);
    begx = begy = rx = ry = 0;
    for(;;) {
        if ((msg = (struct IntuiMessage *)
           GetMsg(win->UserPort)) == NULL) {
             Wait (1 << win->UserPort->mp_SigBit);
             continue;
             }
    *termclass = msg->Class;  *termcode = msg->Code;
    *termgad = (struct Gadget *) (msg->IAddress);
    /* Constrain position to bounds */
    mx = min(msg->MouseX, DR_XMAX);
    mx = max(mx, DR_XMIN);
    my = min(msg->MouseY, DR_YMAX);
    my = max(my, DR_YMIN);
  ReplyMsg(msg);
     switch (*termclass) {
     case CLOSEWINDOW:
       case GADGETUP:
           ModifyIDCMP (win, MyIDCMP_Flags);
           ClearPointer (win);
           LDrawState = S_Nothing;
           return;
```
►

```
        case MOUSEBUTTONS:
            switch (*termcode)
            {
              case SELECTDOWN:
                 begx = mx;   begy = my;
                 ModifyIDCMP(win, MyIDCMP_Flags |
                   MOUSEBUTTONS | INTUITICKS);
                 LDrawState = S_1stElli;
                 SetPointer (win, CrossHair_Pict,
                  CROSSWIDTH, CROSSHEIGHT,
                  CROSSXOFF, CROSSYOFF);
                 break;
                case SELECTUP:
                 ModifyIDCMP (win, MyIDCMP_Flags
                   | MOUSEBUTTONS);
                 if ((LDrawState != S_DrElli) &&
                   (LDrawState != S_1stElli))
                 break;
                 else if (LDrawState == S_DrElli)
                   DrawEllipse (rp, begx, begy,
                        rx, ry);
                 SetDrMd (rp, JAM1);
                 rx = abs(mx - begx);
                 if ((begx-rx) < DR_XMIN)
                  rx = begx - DR_XMIN;
                 else if ((begx+rx) > DR_XMAX)
                  rx = DR_XMAX - begx;
                  ry = abs(my - begy);
                 if ((begy - ry) < DR_YMIN)
                  ry = begy - DR_YMIN;
                 else if ((begy + ry) > DR_YMAX)
                  ry = DR_YMAX - begy;
                 DrawEllipse (rp, begx,begy,rx,ry);
                 ClearPointer (win);
                 LDrawState = S_WaElli;
                 break;
              case MENUUP:
              case MENUDOWN:
              /* Cancel current ellipse */
                 ModifyIDCMP (win, MyIDCMP_Flags
                   | MOUSEBUTTONS);
                  if (LDrawState == S_DrElli)
                   DrawEllipse (rp, begx, begy,
                        rx, ry);
                  LDrawState = S_WaElli;
                  ClearPointer (win);
                  break;
                  } /* end MOUSEBUTTONS switch */
            break;
        case INTUITICKS:
            if (LDrawState == S_1stElli)
            {
                 SetDrMd (rp, COMPLEMENT);
                 LDrawState = S_DrElli;
            }
                 else if (LDrawState == S_DrElli)
                 /* Erase prev. ellipse */
               DrawEllipse (rp, begx, begy, rx, ry);
               else /* Leftover tick after cancel */
                 break;
               rx = abs(mx - begx);
               if ((begx-rx) < DR_XMIN)
                rx = begx - DR_XMIN;
               else if ((begx+rx) > DR_XMAX)
                 rx = DR_XMAX - begx;
               ry = abs(my - begy);
               if ((begy - ry) < DR_YMIN)
               ry = begy - DR_YMIN;
               else if ((begy + ry) > DR_YMAX)
               ry = DR_YMAX - begy;
               DrawEllipse (rp, begx, begy, rx, ry);
               break;
             default:
            break;
        } /* switch */
    } /* for(;;) */
} /* DoElli */
```

■

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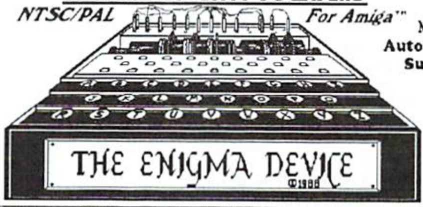
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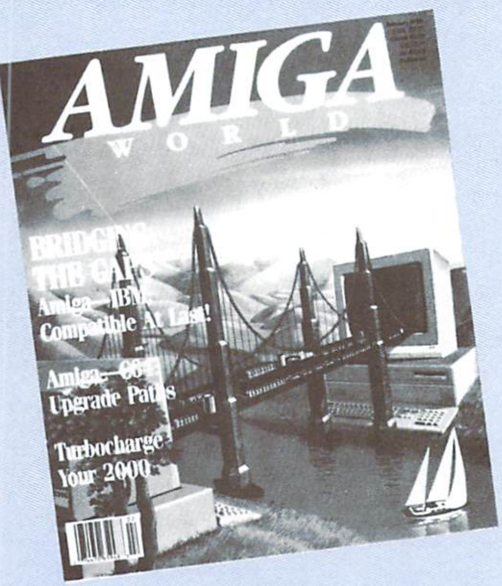
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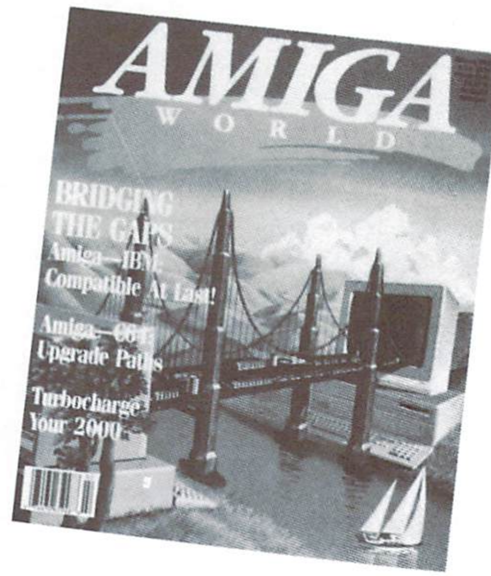
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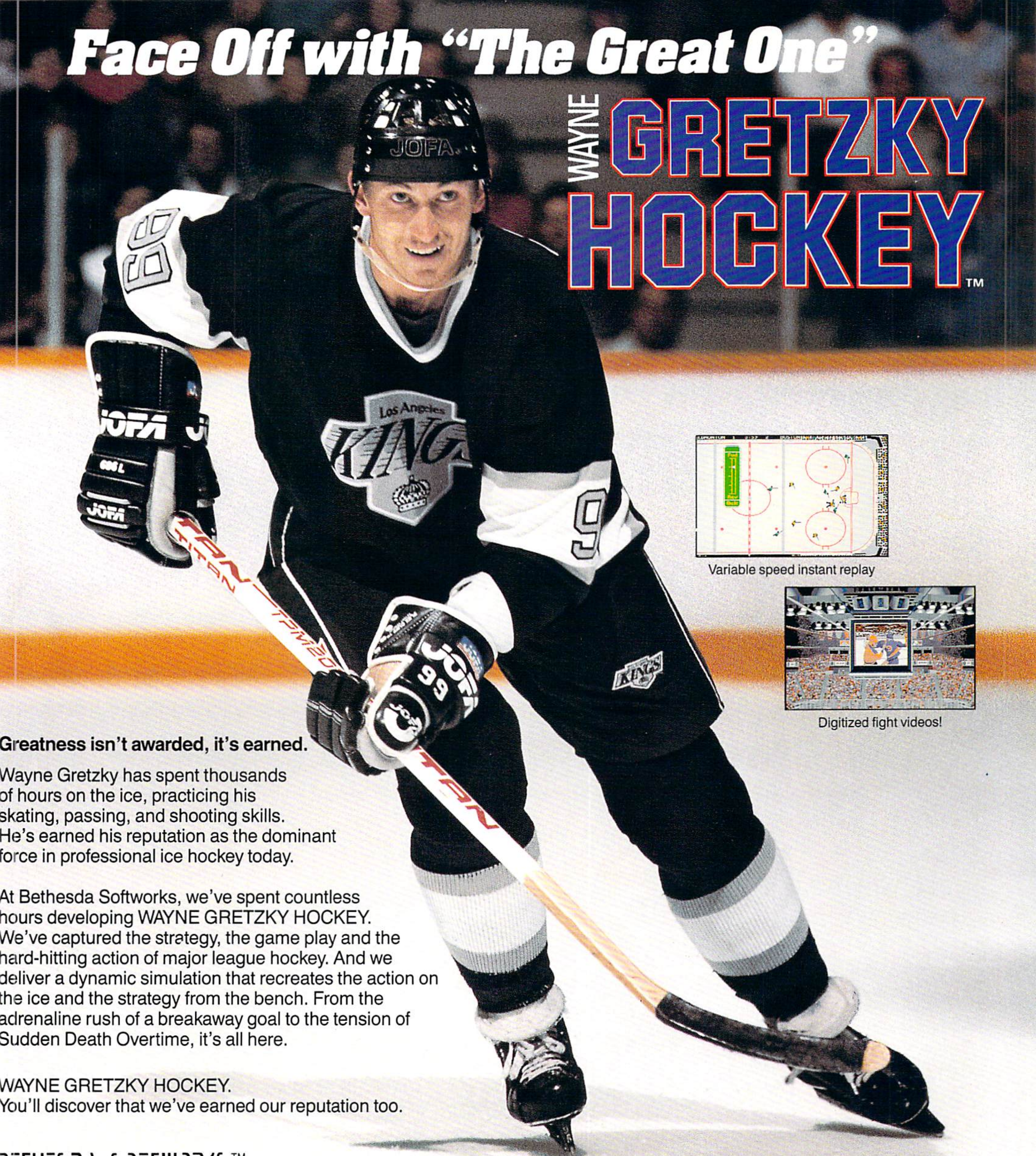
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